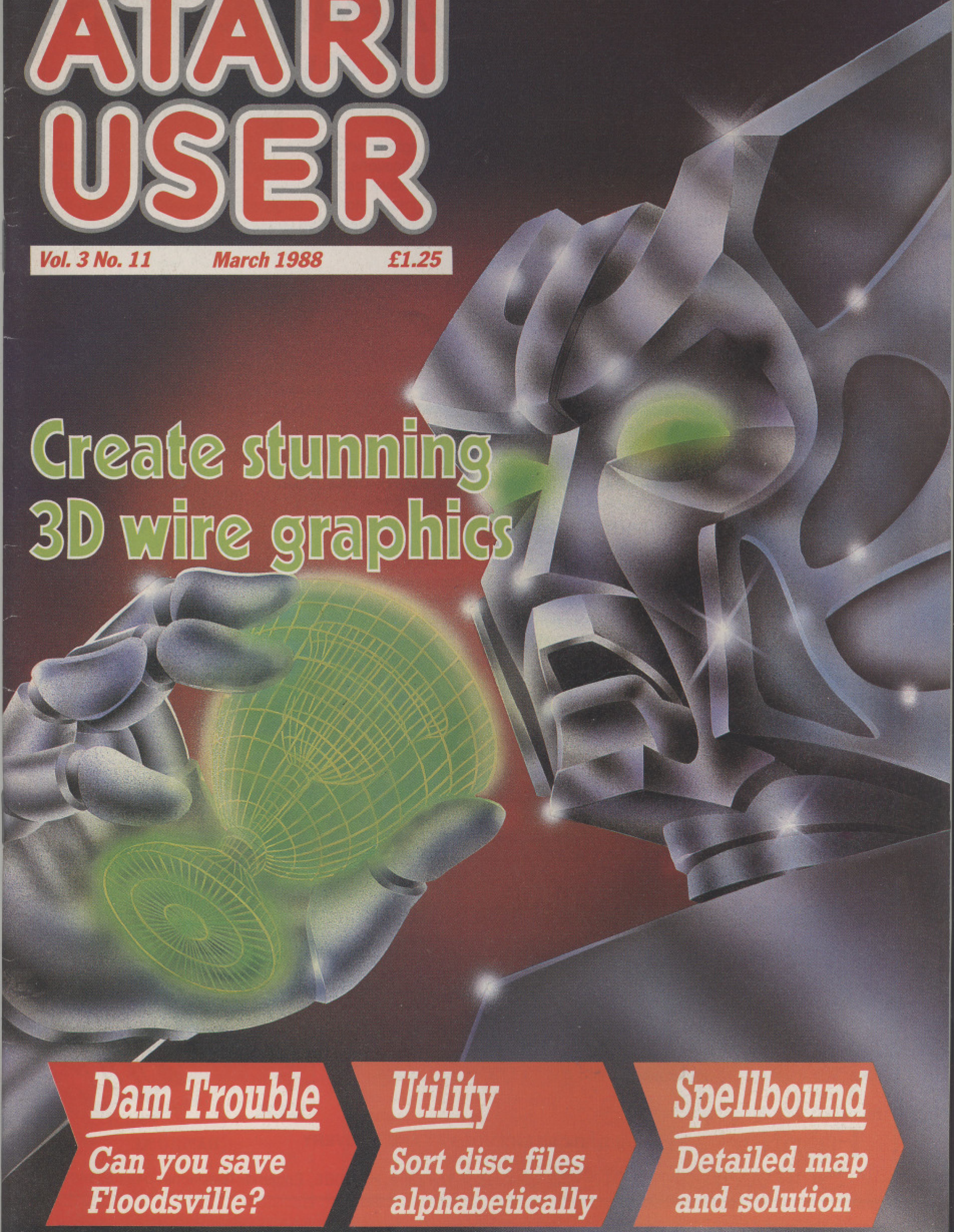
A Database Publication

ATARI USER

Vol. 3 No. 11 March 1988 £1.25



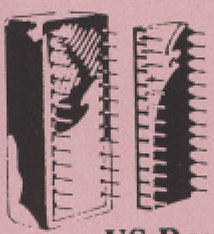
Create stunning 3D wire graphics

Dam Trouble
Can you save Floodsville?

Utility
Sort disc files alphabetically

Spellbound
Detailed map and solution

EXPAND THE CAPABILITIES OF YOUR 8 BIT SYSTEM

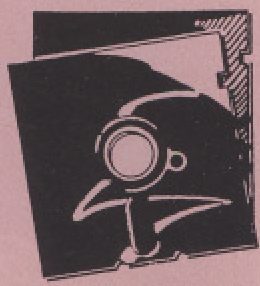


US Doubler

Expanding the 1050 disk drive's strength is what ICD's US Doubler is all about. A true performer in the area of hardware modifications, this chip set quickly transforms your Atari into a powerhouse, radiating with innovative features never before possessed by a 1050. Features like true double density for greater storage, single and dual density support, an accelerated I/O rate designed to triple your speed when combined with SpartaDOS and full compatibility with existing Atari software.

US Doubler two chip set and fitting instructions **£29.95**

This Disk Operating System has been widely acclaimed as the best DOS for the 8 bit Atari range. SpartaDOS from ICD supports everything from 810 disk drives through RAM disks to hard disks. A special menu allows rapid transfer, erasure and locking or unlocking of files using only the Space Bar, Option, Start and Select keys. The utility package supplied also features a 32 character keyboard buffer, intelligent switching between disk densities, a binary file game menu, subdirectories and time/date file stamping.



SpartaDOS Construction Set

SpartaDOS complete with 175 page manual **£29.95**

THE PERFECT COMBINATION – SPARTADOS AND US DOUBLER – ONLY £49.95



P:R:Connection

Now you're no longer limited to Atari compatible printers and modems. The P:R: Connection plugs directly into the serial disk drive port of any 8 bit Atari computer and provides the user with a standard Centronics printer interface and two RS-232 serial ports. It also draws its power from your computer which means one less cord fighting for a power point while its compact size leaves your work space virtually clutter free.

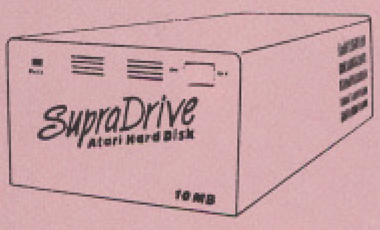
The P:R: Connection's serial ports use a fully compatible R: handler and resemble those of the 850 interface with the same signals and functions.

P:R: Connection and manual **£69.95**

MicroPrint

Supra's MicroPrint is a parallel printer interface for the Atari 8 bit series of computers which plugs into the computer's serial peripheral port and then directly into the printer. It works with most parallel printers and 8 bit software and includes a built-in printer cable.

MicroPrint **£29.95**



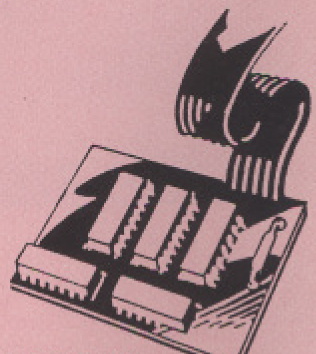
The SupraDrive AT 20Mb hard disk for the Atari XL and XE series connects directly to the computer's parallel bus, allowing high speed data transfer rates of 8-10,000 bytes per second (approximately 10-15 times faster than the normal Atari drives).

The SupraDrive AT stores more than the equivalent of 200 single density Atari disks and can access any information within milliseconds. All this adds up to an extremely efficient system for the serious Atari 8 bit owner. The SupraDrive AT is supplied with hard disk interface, built-in power supply, manual and SpartaDOS.

SupraDrive AT ready to plug in and use **£749.95**

Rambo XL transforms your 800XL into a mighty 256K computer and makes it memory compatible with the 130XE. Now your XL can support Basic XE extended mode or the standard RAM disk supplied with Atari DOS 2.5. With the RD. COM handler supplied with SpartaDOS you get a 192K RAM disk – enough to duplicate a full double density disk in one pass! You must supply eight 256K DRAMS and the DOS of your choice.

Rambo XL with fitting instructions **£29.95**

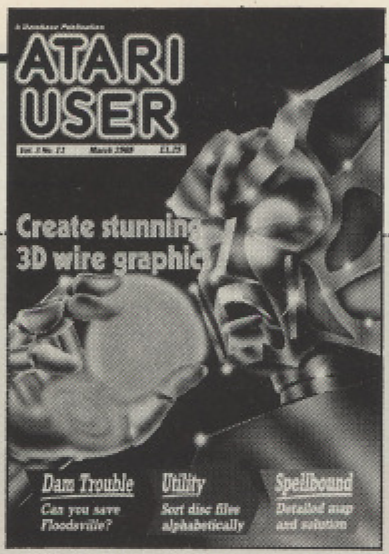


RAMBO XL

ALL PRICES INCLUDE VAT AND DELIVERY

Frontier Software P.O. Box 113, Harrogate, North Yorkshire, HG2 0BE, England. Telephone: 0423 67140

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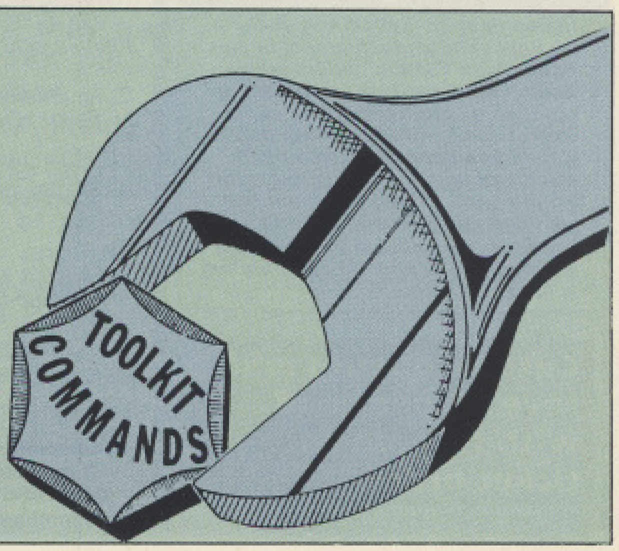
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"Atari User" welcomes program listings and articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by cassette tape or disc. Please enclose stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication by Database Publications Ltd will be on an all-rights basis.

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ATARI USER *exclusive!*

Add TEN new commands to Atari Basic with this latest package from **Atari User.**



SEE PAGE 22

The phenomenal growth in demand for Atari computers means a much bigger home for the BIG show . . .

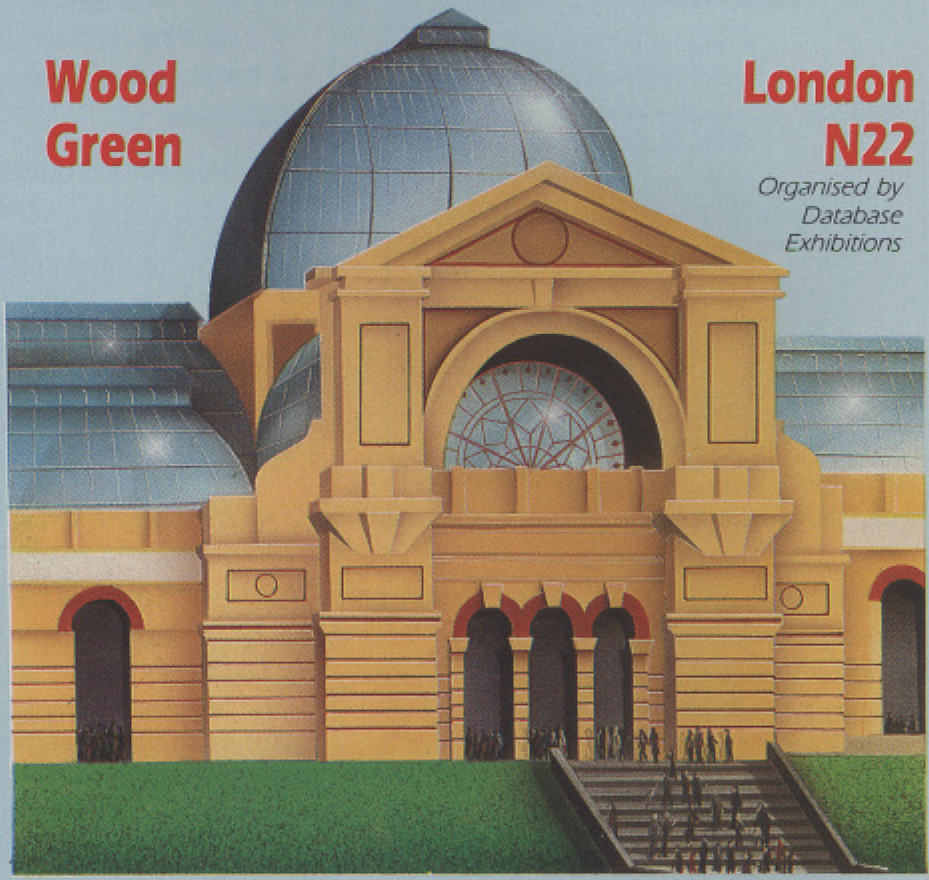
ATARI USER SHOW

Alexandra Palace

Wood Green

London N22

Organised by Database Exhibitions



Friday	Saturday	Sunday
22 April	23 April	24 April
10am-6pm	10am-6pm	10am-4pm

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Advance ticket orders must be received by Wednesday, April 13.

ATARI USER SHOW

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Alexandra Palace, Alexandra Park
Wood Green, London N22
April 22-24, 1988

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A271

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MICROLINK ORDERS: MAILBOX 72:MAG001
Please quote credit card number and full address

A303

Escape death row

A BUDGET price multi-level shoot-'em-up – Zybex – has been announced by Zeppelin Games (091 281 4401).

Zybex, a two-player on-screen game, sets you on an almost suicidal mission to escape death row. To earn a stay of execution you must penetrate the heart of many strange worlds and collect teleport crystals.

Each crystal gives access another level even more difficult than the last. Your goal



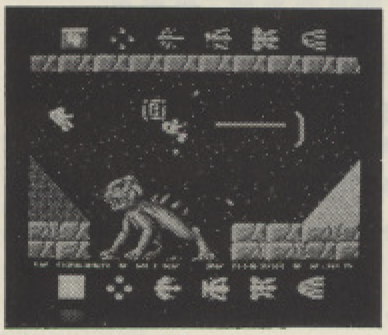
Zybex: Level 6

is to reach the ultimate level and face the find challenge – Zybex.

The last crystal is all powerful and will ensure the removal of the death ring around your neck.

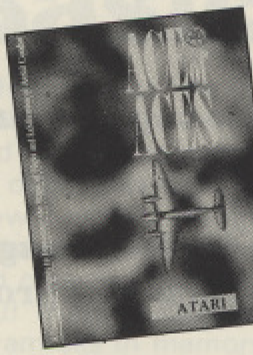
To achieve success you have to shoot your way through several bizarre and colourful waves of aliens, and find exotic weapons with differing powers.

Zybex boasts fast scrolling and superb sound



Zybex: Level 8

effects. Company policy is quality software at a budget price – hence the tag of just £2.99 on cassette from Zeppelin Games.



Try flying a Mosquito

THE latest fighter simulation game for the Atari 8 bit – Ace of Aces – has been released by US Gold (021 356 3388)

The program captures the spirit – and puts you in the cockpit – of the Mosquito RAF fighter bomber of World War II.

Your task is to down Nazi bombers, sink U-boats, outrun V1 rockets and stop enemy trains.

Fuel and weapons have to be chosen wisely, as once you're on a mission there is no going back.

Price £9.99 on cassette and £14.99 on disc.

More 8 bit games in the pipeline

DESPITE rumours to the contrary, Atari is still committed to supporting the 8 bit games market.

Certainly the company is back in the software producing field itself after a layoff of more than a year. That's confirmed by the recent appearance on tape of Twilight World, the forthcoming release of Thunderfox, and the prospect of popular titles being re-released on cartridge.

But some software developers are less than impressed with the level of support Atari is prepared to provide, and note that the company seems to be directing most of its attention to the 16-bit market. And that in turn could mean less Atari software.

Red Rat, which has just launched two twin-packs – Planet Attack/Mad Jax and Space Wars/Dreadnaught – is keeping a watchful eye on sales.

"If these two die the death that'll be it", said Red Rat's Harry Nadler, "though if a really good 8 bit game came through we'd try again".

The problem – if there is one – seems to lie with distributors rather than with the software houses or the buying public.

And with a diminishing number of companies prepared to import software, Atari users are missing out on a wealth of titles available in the States.

Recent releases include Top Gunner from MicroProse at $19.99 and Chessmaster 2000 from Electronic Arts at $29.99. Given the current strength of the dollar, at those prices it's worth thinking about buying direct.

Bigger venue needed for next Atari show

EACH successive Atari User Show has left organisers Database Exhibitions with a happy problem – how to find a bigger, better venue for the next one.

An ever-growing army of exhibitors and visitors means the event has constantly had be on the move to larger premises.

Another big increase in demand for space has dictated that the impressive West Hall of Alexandra Palace, London, will stage the next show in the series from April 22 to 24.

Other premises that had coped well enough on previous occasions could not meet the additional requirements – they had quite literally run out of space for expansion.

It wasn't easy finding a new location that was both large enough to cope with huge numbers of visitors, yet prestigious enough to complement the event. Happily, Alexandra Palace fits the bill in both cases.

Set in 296 acres of rolling countryside, Alexandra Palace has been completely renovated after the devastating fire in 1980.

It is one of the most flexible display areas in the UK, with more than 2,500 sq metres of exhibition space.

So there will be no shortage of room for the hundreds of hardware and software special offers exhibitors have promised to bring along for Atari users.

The Atari Show runs from Friday, April 22 to Sunday, April 24. A money saving advance ticket order form is on Page 61.

ATARI USER NEWS REVIEW

Toolkit boost for old Basic

AT last the gap between the old Atari Basic and the new up-to-date Basic XL/XE cartridges has been reduced – by a new low-cost software package from *Atari User*.

A major criticism of Atari computers over the years has been its less-than-powerful Basic programming language, which lacks such rudimentary commands as Renumber and Delete.

The Toolkit utility, writter by Mick Randle, remedies these deficiencies – and enhances Atari Basic's capabilities as well.

Designed to work on the XL/XE machines and the new XE Games Console, the Toolkit only takes up 128 bytes of user ram. This is achieved by placing the main program into the area of ram below the Basic rom chip and bank switching when required.

When a Basic program is run the Toolkit will switch off and to re-enable it you simply press System Reset. A help file explaining the Toolkit can be found on the disc or tape.

And once it's installed in the computer you will have 10 new direct-mode Basic commands at your finger-tips.

Toolkit's commands provide more control over variables, allowing you to change their names, or to view each name in memory together with the line that it appears on.

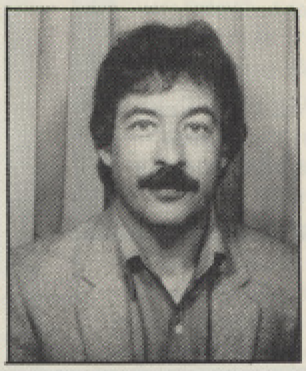
And immediate access to drive directories from Basic is now possible. A single command will turn the keyboard click on or off, and a useful built-in checksum program sits in memory all the time.

Editing is easier too, with commands to delete any number of lines, renumber Basic program lines in any increment and to automatically strip all REM statements from your program listings.

The Listing command provides a full printout of the Atari control characters on an Epson-compatible printer, and the program also offers decimal, hexadecimal and binary conversion from Basic.

It also provides full English error messages, extensive built-in user input error checking and a forgiving command syntax.

Price £7.95 disc, £5.95 cassette.



Mick Randle, the author

The job's taped

IN search of a production team for an idea that's still under wraps, Hewson (0235 832939) has come up with the novel idea of sending an audio cassette to interested candidates.

The cassette lays down the job specifications – as you'd expect – but the voice over has to contend with a battery of sound effects gleaned from Hewson's previous best-selling titles.

Project Four – a five format game for 8 and 16 bit machines – isn't scheduled for release until September, but the concept is already drawn up.

All Hewson needs now is a Project Four team.

They're looking for a leader, two coders, a graphic artist and a free-lance musician.

THE GALLUP CHART TOP 20 ATARI SOFTWARE

THIS MONTH	LAST MONTH	TITLE (Software House)	PRICE
1	1	HENRY'S HOUSE *Mastertronic*	1.99
2	●	ACE OF ACES *US Gold*	9.99
3	3	180 *Mastertronic*	2.99
4	9	TRANSMUTER *Code Masters*	1.99
5	●	FOOTBALLER OF THE YEAR *Gremlin*	9.95
6	18	DIZZY DICE *Players*	1.99
7	8	STORM *Mastertonic*	1.99
8	2	PANTHER *Mastertronic*	1.99
9	●	SOCCER *Alternative*	1.99
10	●	RIVER RAID *Firebird*	1.99
11	●	CASTLE TOP *Alternative*	1.99
12	●	POLE POSITION *Atari*	12.99
13	5	DECATHLON *Firebird*	1.99
14	●	SPACE SHUTTLE *Firebird*	1.99
15	14	LEADERBOARD *Access/US Gold*	9.95
16	●	UNIVERSAL HERO *Mastertronic*	1.99
17	15	BMX SIMULATOR *Code Masters*	1.99
18	20	SILENT SERVICE *Microprose*	9.95
19	4	ON CUE *Mastertronic*	2.99
20	●	BASIL THE GREAT MOUSE DETECTIVE *Gremlin Graphics*	9.99

Compiled by Gallup/Microscope

NINE new entries in this month's chart with the spectacular Ace of Aces going straight to the number two slot. Alternative, Gremlin and Firebird have each got two new titles in the Top 20.

Atari is bringing out new titles in addition to the charting Pole Position – look out for Thunderfox coming soon.

It's a challenge!



Mike Cook throws down the programming gauntlet to all our readers

IF you've just learned to program and don't know what to do next, keep reading. This is the first of a series of articles in which we challenge you to exercise your new-found skill in Basic programming.

It starts on this page with The Challenge itself. You can take up the challenge at various different levels of skill, depending how good you are.

We present you with a problem to solve using your Atari computer. It contains all the information you need to write the program, and if you are a reasonably competent programmer you'll need no further help.

However, if you are just beginning you might not be able to sort all of it out. But just thinking about the problem and trying out a few ideas will help you develop your programming skills.

What you're going to need follows next month: Hints.

In this I'll set out an algorithm you can use to code the problem. This is simply the method you are going to use to implement the solution. It should be relatively straightforward to convert it into a Basic program providing you are familiar with the language.

Then, in the May issue, we'll present The Solution. I will give you a simple no-frills program that will do the job, along with suggestions for further improvement. You can check this against your own answer and perhaps sort out any points you had difficulty with.

Remember, as far as a program is concerned, there are as many right answers as there are wrong ones, but the solutions I favour are simple and readable.

I will avoid, as much as possible, using fancy tricks or so-called clever programming techniques, as most of the time they are not necessary.

So on to Challenge I, which is set in a casino . . .

YOU are down on your luck, standing looking at the roulette wheel, when a shady character tugs at your sleeve. After exchanging a few pleasantries he persuades you to slip outside where he will tell you something to your advantage.

So after cashing your remaining chips you follow him out to the alley behind the casino. He whispers in your ear: "For just a pony, Guv, I can tell you my foolproof plan to win".

Maybe it's the drink that softens your heart, or maybe it's the six-inch stiletto knife you feel poking through his coat into yours, but you decide to give him his money and listen to his advice.

"It's all very simple", he says, pushing the money into his overcoat pocket without even bothering to count it. "Just bet on the red".

Feeling cheated, you ask what happens if you lose. "Even simpler", he replies, "bet on the red again, but this time double your stake. If you lose again, double again, eventually you will win because red is an even money chance".

He continues: "When you count your winnings you will find that you are up by your original stake. Drop your bet down again and do it all over again. You can't lose".

With that he slips into the night and you wander home to think about what he has said. Any bet on the red, or the black for that matter, pays even money – what you bet plus your stake back.

So if you bet a pound and lose, then bet two pounds and win, you get four pounds but have only paid out three – one for the first bet and two for the second. As the roulette wheel comprises black and red numbers in equal amounts, a red is bound to come up sooner or later. It's true, you can't lose!

However, you then remember the green – number zero. It's only one place on the wheel, but when that comes up the house wins all bets. That nudges the odds of the red coming up slightly away from even, but that is only one chance in 37.

Yes, it sounds like a really good scheme, so you go to bed dreaming of what you will spend your money on.

In the morning, once your head has cleared, you begin to think and wonder why, if it is that easy, had that man not done it and made himself a fortune?

Glancing over to your trusty Atari micro you decide to try it out first with pretend money by writing a program to simulate a roulette wheel and test this strategy.

You want to try this not once but many times to ensure it is no fluke. You need to know how many bets it will take to recover your initial outlay of £25 to the man.

What is the best size of bet? The larger the bet the faster you will make money but, also, the more money you will need when doubling. How much stake money will you have to have in reserve? Is it practical?

● *So it's over to you. Can you write the necessary program? If you have problems, next month's hints will help.*

START OF A NEW SERIES

So you want to understand Basic better . . .

No time like the present – start right now with ANDRÉ WILLEY

HAVE you ever been sitting at your keyboard at three o'clock in the morning, staring bleary-eyed at a somewhat fuzzy looking television? *10 PRUNT "DONE"* you type through half-closed eyes...

The result is error – PRUNT indeed! And as you re-type the offending line, your faithful friend Basic continues to monitor your progress, letting you know whenever your fingers slip off the keys until finally sleep overtakes you and you slump over the keyboard.

The other effect that post-midnight programming has on the cerebral cortex is to make your brain wander off at a tangent to the job in hand – and so it was one cold night about five years ago when I suddenly thought "How does it do it?".

Or more specifically, how does Basic manage to check your typing so quickly and, come to that, what does it do with the line you've typed anyway?

Tokenisation

After some research I had established the fact that a process known as *tokenisation* was at work. It seemed that when you type:

```
10 PRINT
```

the computer actually stores the numbers 10, 0, 6, 6, 32 and 22 in memory. Hang on a minute, I hear you cry, that's only six bytes of data stored – and our program line is eight characters long. No wonder those programs only seem to work properly six out of eight times.

Well, what Basic is doing is making up a much shorter, coded, version of your line. In fact, the word PRINT itself is represented by just a single number 32 – known as a token. The first two bytes represent the line number and are followed by two length indicator bytes – both are six in this case because the coded line is a total of six bytes long. The line ends with a terminator byte – the final 22.

But why bother? What's the matter with storing the whole line of text. Well, there are a number of advantages to tokenising. In fact you've already seen a couple of them. To start with the stored version of the line is shorter than the original text – often by a considerable amount. Consider a line such as:

```
14000 POSITION XDISTANCE,YDISTANCE
```

As a piece of text this line is 35 characters long, including the carriage return at the end. Tokenised it becomes just nine bytes of data – and so uses just one quarter of the memory space which would otherwise have been required. On average, a tokenised line is about one-half to two-thirds the size of the original text version – depending on such factors as the length of variable names and how long the command words are.

Also, when the tokenisation process takes place any incorrect statements will immediately be flagged as ERROR lines, thus giving you an instant indication of both the fact that you made a mistake and also the position within the line where the tokeniser couldn't find the syntax it was expecting.

Many computers will let you enter anything at all as a program line even if it's complete rubbish – as is often the case at 3 o'clock in the morning – and you won't find out until you run the program.

Speed advantage

There is also an execution speed advantage to tokenised programs. The theory goes that the machine code routine to look up a single byte from a token table is very much faster than the code that would have to be used to search an entire Ascii text line.

However, this speed advantage is unfortunately lost when you consider Atari Basic's maths routines, which could hardly be described as particularly efficient. As with everything else in life – you win some, you lose some.

Basic's tokenisation process goes much further than just coding PRINT, POSITION and the other major commands. It also tokenises functions and operators – such as CHR$, INT, LEN, SQR, VAL and so on – and variables. We'll be looking at statements, operators and functions in greater detail next time, but for now let's see how Atari Basic deals with variables.

Variables

As an example, consider this simple program:

```
5 LET NUMBER=120
10 PRINT NUMBER
```

We'll examine line 5 in a moment, but since line 10 is so similar to the example we've already looked at let's see what difference the variable *NUMBER* makes to the final tokenised line.

Line 10 now tokenises as 10, 0, 7, 7, 32, 128, 22. If you've been following so far you'll remember that the initial 10 and 0 represent the line number, and the next two numbers tell us how long the tokenised statement is – in this case seven bytes. As before, the 32 means PRINT and the final 22 is an end-of-line marker – so somehow 128 must represent the variable *NUMBER*.

In fact, any token with a value over 127 represents some form of variable – which may be a normal numeric type, an array or a string. Each time you refer to a new variable when typing in a program – such as *NUMBER* in our example – a unique number is reserved for it. If you enter another line which contains a new variable name then it would be assigned the next free number – 129 in this case.

Since a single byte can only store a value of up to 255 we find that Atari Basic can thus only cope with 128 variables in any given program.

Variable name table

The variable names are stored at the beginning of the program in a table known, rather originally, as the variable name table. Each time you use a variable name when typing in a program Basic scans through each entry in the table looking to see whether you've used that one before. If you have it works out the number of the entry and uses it in the tokenised line.

If it comes to the end of the table before finding a match it assumes that you have used a brand new variable name and this will then be added to the end of the list and its number recorded for future reference. This does mean that a lot of mistyped lines can create an awful lot of useless extra entries in the variable name table, sometimes causing problems with more complex programs.

The quick answer is to LIST your program to tape or disc, then type NEW and re-ENTER it into memory. This will force Basic to create a new table containing only the currently required variable names.

While a program is actually running Basic never needs to look at the text in the name table – since every reference to a variable is now coded as a number between 128 and 255. In our example, each time the token 128 is found it knows that we are referring to the variable which we know as *NUMBER*.

Let's now go back to that first line of our program:

```
5 LET NUMBER=120
```

which tokenises into the following sequence:

5, 0, 15, 15, 6, 128, 45, 14,
65, 18, 0, 0, 0, 0, 22

Looking at the bits we already know about, the 5 and the 0 at the start must be the line number. The two 15s tell us that the coded line is 15 bytes long and the 22 at the end signals the finish of the tokenised line. Since we know that the 128 refers to the variable *NUMBER* you will probably have realised that the 6 preceeding it must therefore mean LET.

As it follows straight after the variable name we can safely assume that the token 45 is the code for the equals sign, which just leaves us with the strange sequence 14, 65, 18, 0, 0, 0, 0 to somehow represent the rather innocuous looking number 120.

Atari maths

This is where the Atari maths system's complexities come into their own. Whereas most micros allow us to store numbers in a couple of different ways, Atari Basic allows only the most complex of these methods.

Some languages would allow us to place the number 120 into two bytes as an *integer* variable. All this means means is that the number is stored in memory in much the same way as we access memory addresses like the display list. To get the final value we take the contents of the first byte and then add on the second byte times 256. You might have seen lines such as:

```
DL=PEEK(560)+PEEK(561)*256
```

which use this very method.

This integer system has the advantages of much greater speed and of using less memory, but it can't handle numbers larger than 65335 or decimal fractions such as 1.5 or 0.37.

The alternative system, the only one available in Atari Basic, is known as floating point arithmetic which stores numbers in a scientific form very like the exponential form you might have used for large numbers in your own programs. If you saw 1.5E4 in a listing you would know that it meant 1.5 x 10^4, or 1.5 times 10,000.

The digit 14 in our tokenised line simply tells the computer that a floating point number follows, and this is composed of six bytes. The first of these gives sign information – plus or minus – and the *power of* – exponent – of the number. The other five bytes give the fractional part of the number using a system known as Binary Coded Decimal.

This is not as tricky as it sounds and all it really means is that each byte holds two separate numbers – one in the first four bits and the other in the second four.

In our example, the first of these five BCD numbers is 18 which gives us the binary pattern 0001 0010. The first 0001 is a one in decimal while the second part, 0010, means two. So our fractional part is actually 0.12 – see, it really isn't as difficult as it looked.

We finally have to subtract 64 from the exponent byte before we use it – giving us 65 minus 64 – a grand total of one! Rather than using powers of 10 this system uses powers of 100 to make the work simpler so our final floating point number is 0.12 times 100 to the power of one. This is the same as 0.12 times 100 – or a value of 120, which is what we were hoping for. Perhaps you now see why floating point maths takes so long compared with simple integers.

● *Next month I'll be continuing this exploration of Atari Basic with a more detailed look at the tokenising process, plus a full breakdown of all the available tokens and what they represent. I might even manage to get some sleep in the meantime.*

Mapping your micros memory

Location	Label	Function
128/129	LOMEM	Lowest user-accessible memory address
130/131	VNTP	Variable Name Table pointer (start address)
132/133	VNTD	Variable Name Table dummy (end address)
134/135	VVTP	Variable Value Table pointer (variable contents)
136/137	STMTAB	Statement Table (first address of tokenised program)
138/139	STMCUR	Current statement (Last direct command line)
140/141	STARP	String/Array pointer (string/array contents address)
142/143	RUNSTK	Runtime stack (internal GOSUB/FOR..NEXT addresses)
144/145	MEMTOP	End of current Basic program space

Figure I: Basic's Zero Page Pointer Table

Now that you have a rough idea of how a tokenised program is made up, let's take a look at where everything can be found in your micro's memory.

All the information we require is held in a table of nine two-byte addresses held in zero-page memory as shown in Figure I. Each of these is referred to as a pointer because you must use the value

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contained within it to point you to another memory location.

As I mentioned before, the second byte must be multiplied by 256 before being added to the first. The resulting figure is then the address you actually require.

Locations 128/129 point to the lowest address in memory that Basic is allowed to access (LOMEM). This normally would be either $700 for a cassette system or $1CFC if Dos 2.5 is loaded.

If you use another type of Dos you will find this location points to the first free location beyond Dos's memory. The next 256 bytes are reserved as a temporary work area for the tokenising routines.

Locations 130/131 point to the address of the Variable Name Table, 256 bytes on from LOMEM. It is here that your table of variable names will be stored, in the same order that you first referred to them.

It is worth noting here that string variables have a $ sign stored after the name and array names are followed by a (sign. The last letter or symbol of each name entry is converted to inverse video in order to let Basic know where one name finishes and another begins.

Locations 132/133 point to the first byte after the Variable Name Table – which is normally a dummy zero byte. If you type in a line containing a new variable name it will be stored here and this value moved upwards to the end of the new name.

Locations 134/135 point to the address of the start of the Variable Value Table. It is here that the actual contents of your variables are stored. Each entry in this table is eight bytes long and may contain either a floating point number – in the case of normal variables – or a further pointer to the actual address of strings or arrays. See Figure II for more information.

Locations 136/137 point to the address of the tokenised program itself. If you type in the two line program we have been considering then you can PEEK from this address onwards if you want to see the token structure for yourself.

Locations 138/139 point to the first byte AFTER the tokenised program. It is here that Basic stores your direct command lines while it works out what to do with them. In fact, the last direct command line used will always be available here – complete with an imaginary line number of 32,768. Try PEEKing the address given at 138/139 to find out.

Locations 140/141 point to the first byte after the current statement tokens, and it is here that your arrays and strings are stored. The Variable Value Table, in fact, contains offsets into this area in order to access the various elements of arrays and strings.

Locations 142/143 point to Basic's runtime stack which will hold the return line numbers for all the GOSUB statements and FOR . . . NEXT loops.

Finally, locations 144/145 point to the very last byte required for use by the program – which is also the end of the runtime stack.

Figure III brings all of this information together and shows how these pointers combine to keep track of our example program once it has been tokenised.

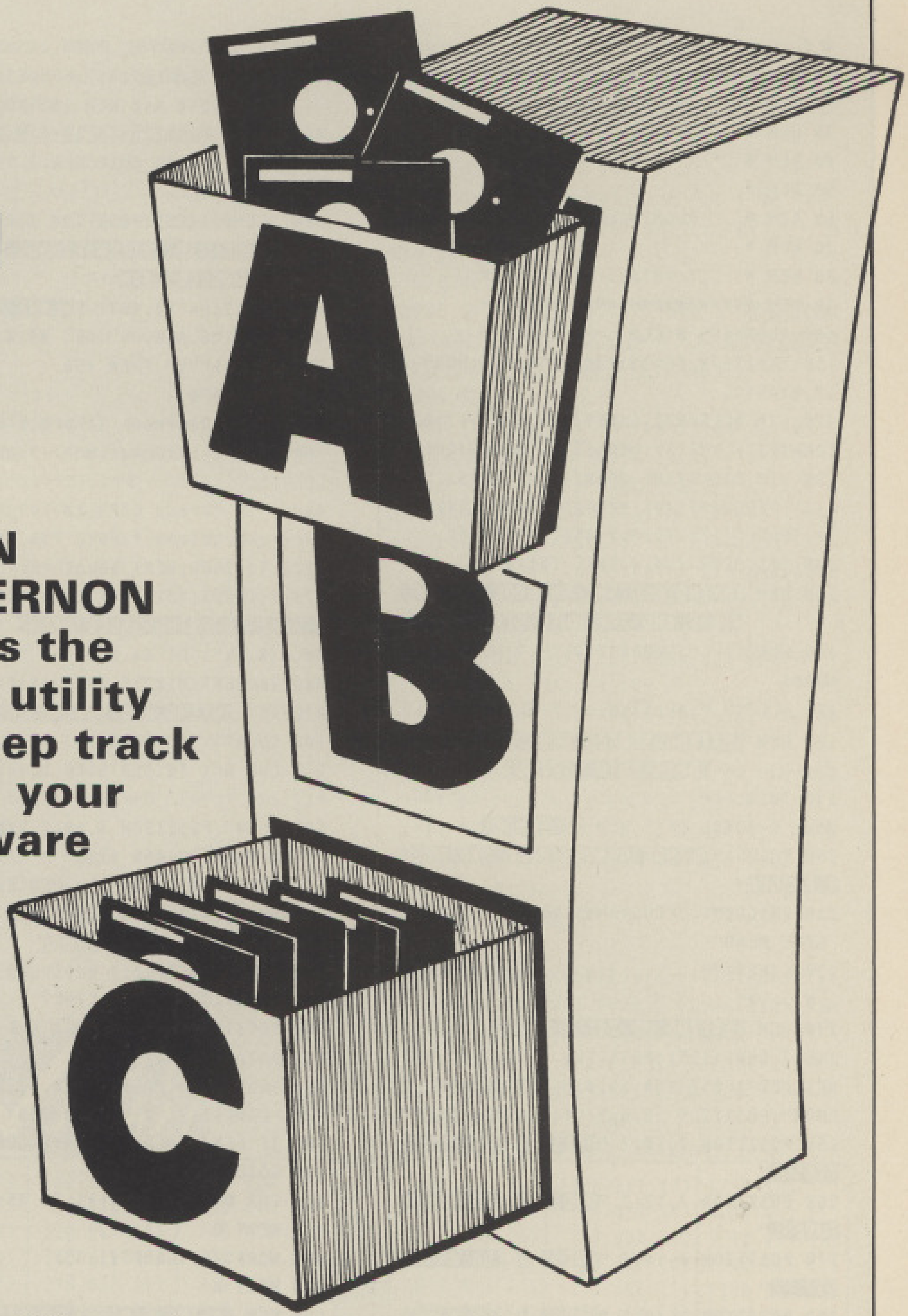
Variable type \ Byte number:	1	2	3	4	5	6	7	8
Numeric	00	Entry number	Six byte Binary Coded Decimal number					
Array (DIMed)	65	Entry number	Offset from STARP		First DIM plus 1		Second DIM plus 1	
String (DIMed)	129	Entry number	Offset from STARP		Current length		DIMed length	
Array (unDIMed)	64	Entry number	not used					
String (unDIMed)	128	Entry number	not used					

Figure II: Types of entry in the Variable Value Table

Label	Name	Bytes	Function
VNTP	Variable Name Table	78 85 77 66 69 210	Ascii for *NUMBER*
VNTD	Variable Name Table dummy	0	Zero byte at end of Variable Name Table
VVTP	Variable Value Table	0 0 65 18 0 0 0 0	BCD contents of variable 0 *(NUMBER)* = 120
STMTAB	Tokenised program	5 0 15 15 6 128 45 14 65 18 0 0 0 0 22 10 0 7 7 32 128 22	5 LET NUMBER=120 10 PRINT NUMBER
STMCUR	Immediate Mode statement	0 128 21 21 25 15 13 68 51 58 78 85 77 66 69 82 46 66 65 83 22	Last direct command used Try working it out!
STARP	String/Array contents	(None)	
RUNSTK	Runtime stack	(None – no program running)	
MEMTOP	End of reserved program area	(One byte beyond end of STMCUR)	

Figure III: Areas of memory after a program has been tokenised

DISC FILER



ALAN McLERNON offers the ideal utility to keep track of all your software

IF, like me, you have numerous discs full of software ranging from utilities to arcade shoot-'em-ups you will find that keeping an ongoing list a bit of a toil. But with easy-to-use Alphabet.ABC that tedious chore is made simpler. You can easily create a mini database of the programs on your discs and print them in alphabetical order.

When you first run the program you are presented with a menu of six categories – shown in Table I. When you have selected the appropriate one – using keys 1 to 6 – you are asked if you want to use the international character set built-in to the XL/XE computers.

You are then asked whether you want to load saved data or continue on to the edit mode. If you choose to load data type Y and all files on disc with the appropriate filename for that category will be loaded.

For example, if the Utilities section is chosen, the computer will load all files with the name UT at the beginning. If you choose to go straight to the edit mode type N followed by Return and the edit screen will appear.

The number of names that you have entered is shown at the top of the screen – this will be one when you first begin editing. Underneath is the filename the data will be saved under. You can now enter any information about the first file, but remember that you are restricted to 35 characters at a time.

The edit line allows you to enter the program name followed by which disc it is on, the side of the disc and whether it is loaded from a menu or by a boot load. When you have entered six names the computer saves them to disc. If, for example, you chose to enter names under the utilities category, the first six would be saved under the filename UT1.SAV, the following six under UT2.SAV and so on.

Categories	Filenames
Utilities	UT.
Adventures	AD.
Arcades	AR.
Strategy	ST.
Simulations	SI.
Music & Demos	MD.

Table I: File categories and filenames

If at any time you want to finish editing and have the data sorted in alphabetical order, type D: followed by Return.

The computer will load all files on the disc previously saved under this category and ask you if you want to merge them with the data in memory – just type Y or N. The data is then sorted alphabetically and you are asked if you want to edit any before moving on to the next function. After this you have the option to print out the data.

You are then asked how many columns you want – 80 gives a very even and paper-saving printout. When the file has been printed you are offered the option to save the newly-amended data file to disc.

If you choose to do so you are prompted to format a blank disc before saving the data – just reply Y or N. Remember saving the new data will erase any files on the disc with the same filenames.

If at any time during the creation of the data file you notice an error, it is possible to edit the data. Re-run the the program and select to load data from disc. Then select Y to edit it and enter the number of the file to edit. Make the new changes and re-save it.

The program is set up to work on an Atari 1029 printer, but if line 1340 is changed to:

```
1340 LPRINT CHR$(27);CHR$(14);NAME$;:L
PRINT :LPRINT
```

it will work on any Epson compatible printer.

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◀ *From Page 13*

```
10 REM ************************
20 REM *      ALPHABET.ABC      *
30 REM *                        *
40 REM *          BY            *
50 REM *                        *
60 REM *    ALAN McLERNON       *
70 REM *                        *
80 REM *    (c)ATARI USER       *
90 REM ************************
100 GRAPHICS 0:CLR
110 XX=12670:EE=35:POKE 756,224:POKE 752,0:DOT=6
120 DIM ALL$(XX),GAME$(40),WORD$(250),COUNT$(3),YN$(3),MERGE$(5),NAME$(20)
130 DIM DISK$(10),COUNT2$(3),A$(5),SAV$(3),PROGRAM$(40),NEWDATA$(40),LINE$(37),SPACE$(17),TOTAL$(45),PAGE$(35)
140 SETCOLOR 2,4,4:POKE 752,1
150 REM TAKING ALL THE GARBAGE OUT OF WORD$ AND THE MAIN STRING ALL$
160 WORD$=" ":WORD$(250)=" ":WORD$(2)=WORD$
170 ALL$=" ":ALL$(XX)=" ":ALL$(2)=ALL$
180 REM GETTING SCREEN AND PRINTER DATA INTO STRINGS
190 TOTAL$="                       YOU HAVE A TOTAL OF ":REM 23 SPACES
200 PAGE$="PLEASE CHANGE PAGE AND PRESS Return"
210 PROGRAM$="PROGRAMME NAME......DISK SIDE MENU"
220 LINE$="*..................*...*...*....*"
230 REM SETTING UP TITLE SCREEN
240 ? CHR$(125):POSITION 13,2:? "ALPHABET.ABC":POSITION 11,4:? "BY ALAN McLERNON":POSITION 12,6:? "(c) ATARI USER"
250 POSITION 7,10:? "PRESS 1 FOR UTILITIES "
260 POSITION 7,12:? "PRESS 2 FOR ADVENTURES "
270 POSITION 7,14:? "PRESS 3 FOR ARCADES    "
280 POSITION 7,16:? "PRESS 4 FOR STRATEGY   "
290 POSITION 7,18:? "PRESS 5 FOR MUSIC &DEMOS"
300 POSITION 7,20:? "PRESS 6 FOR SIMULATORS "
310 OPEN #4,4,0,"K":GET #4,K:CLOSE #4
320 REM GIVING DISK FILENAME AND PRINTER DATA NAME
330 POKE 756,224
340 IF CHR$(K)="1" THEN DISK$="D:UT.":NAME$="UTILITIES":SPACE$="               ":GOTO 410:REM 15 SPACES
350 IF CHR$(K)="2" THEN DISK$="D:AD.":NAME$="ADVENTURES":SPACE$="               ":GOTO 410:REM 15 SPACES
360 IF CHR$(K)="3" THEN DISK$="D:AR.":NAME$="ARCADES":SPACE$="                ":GOTO 410:REM 16 SPACES
370 IF CHR$(K)="4" THEN DISK$="D:ST.":NAME$="STRATEGY":SPACE$="                ":GOTO 410:REM 16 SPACES
380 IF CHR$(K)="5" THEN DISK$="D:MD.":NAME$="MUSIC & DEMOS":SPACE$="             ":GOTO 410:REM 13 SPACES
390 IF CHR$(K)="6" THEN DISK$="D:SI.":NAME$="SIMULATORS":SPACE$="               ":GOTO 410:REM 15 SPACES
400 ? "K":POSITION 5,10:? " PLEASE ENTER 1,2,3,4,5 OR 6":FOR N=1 TO 600:NEXT N:GOTO 140
410 ? CHR$(125):POSITION 3,17:? "DO YOU WISH TO USE INTERNATIONAL CHARACTERS Y/N"
420 POSITION 14,20:? "XL*XE ONLY"
430 OPEN #4,4,0,"K":GET #4,K:CLOSE #4:IF CHR$(K)="Y" THEN 450
440 GOTO 470
450 ? :? "Remember to press CONTROL to print the international character set."
460 ? :? "Press CAPS to return to standard characters.":POKE 756,204:FOR DELAY=1 TO 2000:NEXT DELAY
470 ? CHR$(125):POSITION 2,11:? "DO YOU WANT TO ENTER SAVED DATA? Y/N":OPEN #4,4,0,"K":GET #4,K:CLOSE #4
480 IF CHR$(K)="Y" THEN 1090
490 REM TAKING AND SAVING DATA TO DISK
500 COUNT$="1":POKE 752,0
510 FOR N=1 TO 210 STEP 35:DINUM=DINUM+1
520 ? "K":POSITION 3,10:? "INPUT NAMES DISK NUMBERS AND SIDE"
530 POSITION 10,4:? "NAMES ENTERED = ";DINUM:POSITION 10,6:? "FILE NAME ";DISK$
540 POSITION 3,12:? PROGRAM$
550 POSITION 3,14:? LINE$
560 POSITION 3,18:? "WRITE D: TO RETRIEVE DATA FROM DISK"
570 TRAP 1310:POSITION 2,13:INPUT GAME$:IF GAME$(1)="D:" THEN 780
580 IF LEN(GAME$)<35 THEN 600
590 GOTO 610
600 FOR Q=LEN(GAME$)+1 TO 35:GAME$(Q)=" ":NEXT Q
610 WORD$(N)=GAME$(1,35)
620 NEXT N
630 REM SAVING 6 NAMES TO DISK
640 COUNT=COUNT+1
650 COUNT$(1,3)=STR$(COUNT)
660 DISK$(5)=COUNT$
670 ? "K":POSITION 5,10:? "***SAVING DATA ";DISK$;" TO DISK"
680 IF LEN(WORD$)<210 THEN 700
690 GOTO 710
700 FOR L=LEN(WORD$)+1 TO 210:WORD$(L)=" ":NEXT L
710 TRAP 750:OPEN #1,8,0,DISK$
720 ? #1,WORD$
730 CLOSE #1
740 GOTO 510
750 ? "ERROR ";PEEK(195):? "PRESS F TO FORMAT OR Return TO RETRY":INPUT YN$:CLOSE #1
760 IF YN$="F" THEN ? "ARE YOU SURE Y/N":INPUT YN$:IF YN$="Y" THEN TRAP 750:XIO 254,#1,0,0,"D:1"
770 GOTO 710
780 ? "K":POSITION 3,10:? "***LOADING PROGRAM DATA NOW***"
790 DL=DL+1:COUNT2$(1,3)=STR$(DL):DISK$(5)=COUNT2$:TRAP 850:OPEN #1,4,0,DISK$:? DISK$
800 INPUT #1,WORD$
810 ALL$(EE)=WORD$(11,220)
820 EE=EE+LEN(WORD$)-10
830 CLOSE #1
840 GOTO 790
850 DL=DL-1:CLOSE #1:POSITION 3,5:? "DO YOU WANT TO MERGE DATA Y/N    ":INPUT YN$:IF YN$="Y" THEN 1090
860 NAMES=DL*6:MAX=NAMES*35:? "K":POSITION 3,15:? "GETTING THINGS SORTED PLEASE WAIT....":CLOSE #1
870 POSITION 3,17:? "DATA LOADED= ";NAMES;"=NAMES";" DATA LENGTH ";MAX:POKE 752,1
880 ALP=0
890 FOR Z=1 TO NAMES
900 X=Z*35
910 Y=X+35
920 IF Y>MAX THEN 990
930 IF ALL$(Y,Y+34)>=ALL$(X,X+34) THEN 990
940 WORD$=ALL$(Y,Y+34)
950 ALL$(Y)=ALL$(X,X+34)
960 ALL$(X)=WORD$
970 ALL$(MAX+70)=" "
980 ALP=ALP+1
990 NEXT Z
1000 IF ALP>0 THEN 880
1010 GOTO 1170
1020 TRAP 1060:? "K":POSITION 5,15:? "DO YOU WANT TO PRINT YOUR DATA":OPEN #4,4,0,"K":GET #4,K
1030 CLOSE #4:IF CHR$(K)="Y" THEN 1360
1040 GOTO 1790
1050 REM ALL PRINTER ERRORS COME HERE
1060 CLOSE #3:IF PEEK(195)=138 THEN 1080
1070 POSITION 5,20:? "    ERROR PLEASE TRY AGAIN":GOTO 1020
1080 POSITION 5,20:? "PRINTER NOT ON LINE! TRY AGAIN":FOR DELAY=1 TO 500:NEXT DELAY:GOTO 1020
1090 ? "KLOADING MERGE DATA NOW........"
1100 MERGE=MERGE+1:MERGE$=STR$(MERGE):DISK$(5,7)=MERGE$:IF VAL(MERGE$)=10 THEN DOT=DOT+1
1110 DISK$(DOT)=".SAV"
1120 ? DISK$
1130 TRAP 860:OPEN #1,4,0,DISK$:INPUT #1,WORD$
1140 ALL$(DL*6*35+35)=WORD$
1150 DL=DL+1
1160 CLOSE #1:GOTO 1100
1170 ? "K"
1180 FOR P=1 TO NAMES:PRINT P;" ";ALL$(P*35,P*35+34)
1190 NEXT P
1200 POKE 752,0:? :? :? :? :? :POSITION 5,20:? "DO YOU WANT TO EDIT ANY DATA Y/N":INPUT YN$:IF YN$="Y" THEN 1220
1210 GOTO 1020
1220 ? "ENTER FILE NUMBER TO EDIT OR PRESS          RETURN TO LIST":TRAP 1230:INPUT A:IF A>0 THEN 1270
1230 ? "K":POSITION 5,17:? "WHEN DATA IS LISTED PLEASE ENTER No TO EDIT"
1240 FOR N=1 TO 100:NEXT N
1250 FOR P=1 TO NAMES:PRINT P;" ";ALL$
```

```
(P*35,P*35+34):FOR DELAY=1 TO 30:NEXT
DELAY:NEXT P
1260 TRAP 1230:INPUT A
1270 ? "↖":POSITION 0,13:? "   ";ALL$(
A*35,A*35+34):POSITION 10,18:? "ENTER
THE NEW DATA"
1280 POSITION 3,12:? PROGRAM$:POSITION
 3,14:? LINE$:POSITION 2,13:INPUT NEWD
ATA$:ALL$(A*35,A*35+34)=NEWDATA$
1290 GOTO 880
1300 REM MAIN SCREEN INPUT ERRORS COME
 HERE
1310 ? "↖":POSITION 5,15:? "YOU DID NO
T ENTER ANYTHING ":POSITION 16,17:? "T
RY AGAIN":GOTO 530
1320 REM PRINTING
1330 REM HEADER FOR PRINTER
1340 LPRINT CHR$(27);CHR$(14);SPACE$;C
HR$(27);CHR$(25);NAME$;CHR$(27);CHR$(2
6):LPRINT :LPRINT
1350 LPRINT PROGRAM$;"       ";PROGRAM$
:LPRINT :RETURN
1360 POSITION 5,17:? "NOW HOW MANY COL
UMNS":INPUT PCOL
1370 PB=NAMES:PA=(PB/2):IF PCOL<80 THE
N 1670
1380 IF NAMES>90 THEN 1480
1390 REM PRINTING DOUBLE CLOUMN 90 OR
LESS NAMES
1400 GOSUB 1340:REM GO TO HEADER
1410 FOR N=1 TO PA
1420 TT=N+PA:? ALL$(N*35,N*35+34):? :?
 ALL$(TT*35,TT*35+34):?
1430 OPEN #3,8,0,"P:":? #3;CHR$(27);CH
R$(23);ALL$(N*35,N*35+34);"      ";ALL$
(TT*35,TT*35+34):CLOSE #3
1440 NEXT N
1450 LPRINT :LPRINT :LPRINT TOTAL$;NAM
ES;" ";NAME$:FOR U=N TO 70:LPRINT :NEX
T U
1460 GOTO 1790
1470 REM PRINTING DOUBLE COLUMN 96 OR
MORE NAMES
1480 G=1:R=45:T=45
1490 GOSUB 1340:REM GO TO HEADER
1500 FOR N=G TO NAMES:SA=SA+1
1510 P=R+N:? ALL$(N*35,N*35+34):? :? A
LL$(P*35,P*35+34):? :?
1520 OPEN #3,8,0,"P:":? #3;CHR$(27);CH
R$(23);ALL$(N*35,N*35+34);"      ";ALL$
(P*35,P*35+34):CLOSE #3
1530 IF N=T THEN 1550
1540 NEXT N
1550 IF NAMES-(N*2)<90 THEN 1580
1560 G=G+90:T=G+44:? PAGE$:INPUT YN$:G
OSUB 1340:REM GO TO HEADER FOR NEW PAG
E
1570 GOTO 1500
1580 A=(NAMES-P)/2:P=P+1
1590 ? PAGE$:INPUT YN$:XZ=NAMES-(A*2)+
1
1600 GOSUB 1340:REM GO TO HEADER AND P
RINT LAST PAGE
1610 FOR Y=XZ TO NAMES-A:WQ=Y+A:? ALL$
(Y*35,Y*35+34):? :? ALL$(WQ*35,WQ*35+3
4):? :?
1620 OPEN #3,8,0,"P:":? #3;CHR$(27);CH
R$(23);ALL$(Y*35,Y*35+34);"      ";ALL$
(WQ*35,WQ*35+34):CLOSE #3
1630 NEXT Y
1640 LPRINT :LPRINT TOTAL$;NAMES;" ";N
AME$:FOR U=A*2 TO 70:LPRINT :NEXT U
1650 GOTO 1790
1660 REM PRINTING SINGLE COLUMN
1670 PAGE=45:POKE 756,204
1680 LPRINT CHR$(27);CHR$(14);"     ";
CHR$(27);CHR$(25);NAME$;CHR$(27);CHR$(
26):LPRINT :LPRINT :REM SINGLE HEADER
1690 LPRINT "  ";PROGRAM$:LPRINT
1700 FOR N=1 TO NAMES
1710 IF N=PAGE THEN ? PAGE$:INPUT YN$:
GOTO 1730
1720 GOTO 1760
1730 PAGE=PAGE+45
1740 LPRINT CHR$(27);CHR$(14);"     ";
CHR$(27);CHR$(25);NAME$;CHR$(27);CHR$(
26):LPRINT :LPRINT
1750 LPRINT "  ";PROGRAM$:LPRINT
1760 ? ALL$(N*35,N*35+34)
1770 OPEN #3,8,0,"P:":? #3;CHR$(27);CH
R$(23);"  ";ALL$(N*35,N*35+34):CLOSE #
3:NEXT N
1780 LPRINT :LPRINT :LPRINT TOTAL$;NAM
ES;" ";NAME$:FOR N=N TO 70:LPRINT :NEX
T N
1790 ? "↖":POSITION 5,13:? "DO YOU WAN
T TO SAVE YOUR DATA Y/N":INPUT YN$:IF
YN$="Y" THEN 1840
1800 IF YN$="N" THEN 1960
1810 GOTO 1790
1820 IF PEEK(195)=173 THEN POSITION 10
,15:? "↖":? "BAD DISK-DISCARD DISK PRE
SS Return...                TO TRY AGAIN."
1830 INPUT YN$
1840 ? "↖":POSITION 5,16:? "DO YOU HAV
E TO FORMAT D:1 Y/N":INPUT YN$:IF YN$=
"Y" THEN 1860
1850 GOTO 1910
1860 GRAPHICS 2:POSITION 2,6:? #6;"ARE
 YOU SURE Y/N":INPUT YN$:IF YN$="Y" TH
EN 1900
1870 GOTO 1910
1880 IF PEEK(195)=169 THEN ? "TO MANY
FILES ON DISK INSERT":? "NEW DISK. PRE
SS Return TO TRY AGAIN":INPUT YN$
1890 GOTO 1790
1900 TRAP 1820:? "↖":POSITION 10.10:?
"FORMATING":XIO 254,#1,0,0,"D:1"
1910 TRAP 1880:? "SAVING DATA":CLOSE #
1:WORD$=" ":WORD$(250)=" ":WORD$(2)=WO
RD$:SA1=0:DISK$(5,7)="   ":DOT=6
1920 FOR N=35 TO MAX STEP 210:WORD$=AL
L$(N,N+209):SA1=SA1+1:SAV$=STR$(SA1):D
ISK$(5,7)=SAV$
1930 IF VAL(SAV$)=10 THEN DOT=DOT+1
1940 DISK$(DOT)=".SAV"
1950 ? DISK$:OPEN #1,8,0.DISK$:? #1;WO
RD$:CLOSE #1:NEXT N
1960 ? "↖":POSITION 1,16:? "DO YOU WAN
T TO DELETE (USED FILES) Y/N."
1970 CLOSE #4:OPEN #4,4,0,"K":GET #4,K
:CLOSE #4:IF CHR$(K)="Y" THEN 1990
1980 GOTO 2020
1990 ? "DELETING"
2000 DL=0
2010 DL=DL+1:COUNT$(1,3)=STR$(DL):DISK
$(5)=COUNT$:TRAP 2020:? DISK$:XIO 33,#
1,0,0,DISK$:CLOSE #1:GOTO 2010
2020 GRAPHICS 2+16:COLOR 0:POSITION 5,
4:? #6;"ALL DONE":SETCOLOR 0,8,8:FOR N
=1 TO 200:NEXT N:END
```

Get it right!

10 CP1 (Y)	350 699 (N)	690 RUD (H)
20 CP2 (3)	360 9JQ (T)	700 G46 (R)
30 CP3 (X)	370 98Y (1)	710 MK7 (G)
40 CP4 (4)	380 HFO (9)	720 YJ1 (F)
50 CP5 (Y)	390 632 (C)	730 MAF (X)
60 CP6 (7)	400 4VD (G)	740 QYE (A)
70 CP7 (X)	410 XKW (U)	750 CMM (U)
80 CP8 (8)	420 XLP (P)	760 DNF (P)
90 CP9 (Y)	430 8H5 (5)	770 RLE (2)
100 9QQ (C)	440 R7A (L)	780 LEN (T)
110 P25 (O)	450 YMA (C)	790 X4T (3)
120 J6E (2)	460 DMW (P)	800 TGK (U)
130 XD2 (F)	470 5LE (D)	810 CPO (K)
140 SU5 (O)	480 KPV (H)	820 81Q (J)
150 DGS (D)	490 DYV (Y)	830 MAG (F)
160 5JO (S)	500 7FO (Y)	840 RQF (P)
170 3QS (6)	510 7FV (R)	850 FST (Y)
180 DUS (D)	520 WVA (R)	860 6Q1 (V)
190 VM2 (5)	530 X9Q (7)	870 840 (Y)
200 7UL (J)	540 UC7 (6)	880 E4K (F)
210 WQH (N)	550 E7C (S)	890 CU7 (6)
220 6FM (C)	560 E3M (M)	900 LOH (Q)
230 D7T (7)	570 ML1 (K)	910 L4T (V)
240 U9C (K)	580 N57 (F)	920 8J1 (V)
250 K4T (G)	590 RQC (Y)	930 A08 (F)
260 HLS (D)	600 HLO (6)	940 EFU (S)
270 8YS (A)	610 3NU (R)	950 H53 (P)
280 D4V (K)	620 PC6 (Y)	960 XR5 (H)
290 NNO (7)	630 D7X (Q)	970 640 (S)
300 M1S (T)	640 WFS (P)	980 WRM (V)
310 OEJ (J)	650 PDQ (K)	990 RQ9 (U)
320 D3U (V)	660 5AO (9)	1000 DQQ (J)
330 TO1 (5)	670 PD6 (L)	1010 P1D (R)
340 85R (C)	680 TKS (2)	1020 ENT (M)

1030 OUW (O)	1370 LKT (7)	1710 S84 (L)
1040 PFD (8)	1380 Q37 (T)	1720 Q4V (9)
1050 D8N (G)	1390 DVN (Y)	1730 WT9 (A)
1060 875 (3)	1400 2MP (J)	1740 A8T (E)
1070 MY7 (1)	1410 5GE (T)	1750 317 (R)
1080 FX4 (Y)	1420 JEM (8)	1760 CGF (N)
1090 EU3 (A)	1430 4G4 (D)	1770 HM2 (2)
1100 JWS (H)	1440 NSS (F)	1780 VTY (G)
1110 666 (X)	1450 VA9 (U)	1790 UH8 (Y)
1120 V9T (R)	1460 Q2D (J)	1800 ECX (T)
1130 TXL (Q)	1470 DVN (M)	1810 Q8D (Q)
1140 H2V (A)	1480 52Q (4)	1820 C3Y (T)
1150 T6Y (E)	1490 36P (8)	1830 X46 (N)
1160 8S8 (C)	1500 006 (J)	1840 8M9 (R)
1170 HNA (T)	1510 5LA (V)	1850 QFD (N)
1180 8HN (1)	1520 Y12 (C)	1860 1CW (V)
1190 NUS (5)	1530 8VG (4)	1870 QKD (J)
1200 H9W (O)	1540 NWS (6)	1880 KC7 (3)
1210 P5V (R)	1550 TCN (1)	1890 QRD (D)
1220 ANX (Y)	1560 XQV (A)	1900 141 (5)
1230 OKJ (J)	1570 Q1V (H)	1910 26N (P)
1240 M3X (A)	1580 DG2 (8)	1920 88L (Y)
1250 JNY (G)	1590 DV3 (C)	1930 10A (S)
1260 A1C (M)	1600 2VP (4)	1940 7D6 (K)
1270 2RQ (1)	1610 WVX (F)	1950 4E5 (G)
1280 WQS (L)	1620 5EP (V)	1960 5OP (R)
1290 PXV (C)	1630 PNS (U)	1970 USU (G)
1300 DAN (D)	1640 VV4 (W)	1980 QJV (H)
1310 U6J (U)	1650 Q8D (P)	1990 Y81 (K)
1320 DFN (V)	1660 E2N (K)	2000 D1D (9)
1330 DHN (U)	1670 6HU (2)	2010 FH9 (9)
1340 92O (U)	1680 L7O (2)	2020 DPP (Y)
1350 HD6 (9)	1690 357 (M)	
1360 AA4 (R)	1700 F1U (F)	

5 LINERS

DECIMAL TO BINARY CONVERTER
from Jason Peasgood

MANY programs have been published to perform the simple task of converting a decimal number to its binary equivalent, but none of them have worked in quite the same fashion as this. When first run the program sets up a machine code routine that resides in Page 6 – that useful little area of memory.

To obtain a binary equivalent of a decimal number type the following expression followed by Return:

```
X=USR(1536,n)
```

where *n* is any decimal number from 0 to 255. The computer will then instantly print the binary number on the inverse line at the top of a Graphics 0 screen.

Before typing in the program enter POKE 82,0 so you can fit in the extra length of the lines. Then save a copy before running it – if you mis-type the data statements it could cause a crash, so remember to use Get it Right! to check it.

```
1 FOR R=1536 TO 1686:READ A:POKE R,A:N
EXT R:DATA 104,165,88,133,0,165,89,133
,1,160,0,104,104,141,164,6,160,39,169
2 DATA 128,145,0,136,192,255,208,249,1
60,2,169,162,145,0,200,169,233,145,0,2
00,169,238,145,0,200,169,225,145,0,200
,169
3 DATA 242,145,0,200,169,249,145,0,200
,200,169,141,145,0,160,0,169,128,141,1
65,6,169,64,141,166,6,169,32,141,167,6
,169
4 DATA 16,141,168,6,169,8,141,169,6,16
9,4,141,170,6,169,2,141,171,6,169,1,14
1,172,6,162,1,160,11,173,164,6,221,164
,6,48
5 DATA 9,253,164,6,32,137,6,76,130,6,3
2,145,6,200,232,224,9,208,230,96,141,1
64,6,169,145,145,0,96,169,144,145,0,96
,0,0
```

Get it right!

```
1 M4F (5)
2 SJT (H)
3 QXM (C)
4 KN4 (N)
5 PP5 (1)
```

RESISTANCE FINDER
from S. A. O'Hanrahan

THIS program is, in fact, a little bit of a cheat, and is actually six lines instead of five because I just couldn't fit it in!

It works out the resistance value of resistors from their coloured bands – very handy for the electronics enthusiast with a poor memory, like me.

As you probably know, most resistors have three coloured bands which, when you know the codes, translate to give a resistance. Some resistors have a fourth band – the tolerance value – and some even have a fifth band which is the temperature coefficient. This program only deals with the three *important* bands.

When first run the program will prompt you to enter the three coloured bands of the resistor you want to check – these must be entered one at a time followed by Return.

If at any time the computer doesn't recognise one or more of the inputs it will re-run the program. It then prints on screen the value found – in ohms – and prompts to run again.

PROGRAM BREAKDOWN

- **1** Clears the screen and turns the cursor off. Sets the TRAP statement and dimensions four strings.
- **2-3** Checks other colours against the DATA to obtain the band values.
- **4** Works out the resistance and then prints it to screen.
- **5-6** DATA statements holding the allowable colours and their values.

```
1 ? "K":POKE 752,1:TRAP 1:DIM A$(10),B
$(10),C$(10),D$(10):INPUT A$,B$,C$:RES
TORE :FOR R=1 TO 12:READ D$,A,B:IF D$=
A$ THEN X=A*10
2 IF D$=B$ THEN Y=A
3 IF D$=C$ THEN Z=B:IF B=-1 THEN RUN
4 NEXT R:RESI=(X+Y)*Z:? :? "Resistance
 is ";RESI;" Ohms.":? :? "Any key to c
ontinue":OPEN #1,4,0,"K:":GET #1,K:CLO
SE #1:RUN
5 DATA BLACK,0,1,BROWN,1,10,RED,2,100,
ORANGE,3,1E3,YELLOW,4,1E4,GREEN,5,1E5,
BLUE,6,1E6,VIOLET,7,1E7
6 DATA GREY,8,-1,WHITE,9,-1,GOLD,-1,.1
,SILVER,-1,.01
```

Get it right!

```
1 2KS (W)
2 32Q (W)
3 5GC (1)
4 7QU (V)
5 0K8 (U)
6 6HC (R)
```



IF you've written any useful or interesting five line programs why not send them to us to grace our pages?

Win £25

We pay £25 for each one published.

You should give a full description of the routine and any other details that are relevant. And remember if you want your material returning please enclose a suitably stamped package.

Simply send a copy of the program on disc or tape together with the documentation – preferably as a word processed file – to:

Atari User, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

COLOUR CONTRAST
from David Manlove

IT can be very annoying when trying out colours to find one that is exactly the same luminance as the text. When this happens you lose sight of everything you type and System Reset isn't an elegant way of getting over the problem.

This program provides a constant contrast between background colour and text luminance by checking them 60 times a second. So if the screen is a light colour the text will be dark and vice versa. The program uses a vertical blank interrupt and the VVBLKD register at locations 548 and 549.

To test that the program is working correctly type SETCOLOR 2,4,10 before you run it. The text should vanish from the screen. Now run the program, type SETCOLOR 2,4,10 again and the text will be easily readable.

PROGRAM BREAKDOWN

- **10** Sets up the machine code in Page 6.
- **20** Checks to see what revision of Basic the machine has got and changes the vectors accordingly.
- **30** Changes the deferred Vertical Blank registers to point to the utility.
- **40** Executes the demo and prints a message.
- **50** The machine code data statements.

```
10 GRAPHICS 0:FOR L=1536 TO 1560:READ
D:POKE L,D:NEXT L
20 IF PEEK(47424)=169 THEN POKE 1559,6
2:POKE 1560,233
30 POKE 548,0:POKE 549,6:PRINT :PRINT
"Demo..."
40 FOR L=0 TO 255:POKE 710,L:FOR D=0 T
O 5:NEXT D:NEXT L:PRINT :PRINT "Now tr
y it yourself!"
50 DATA 173,198,2,41,15,201,7,176,8,16
9,14,141,197,2,76,22,6,169,0,141,197,2
,76,130,194
```

Get it right!

```
10 K6T (4)
20 3YH (5)
30 5QD (2)
40 3UC (P)
50 706 (X)
```



BARPOUND SIGN
from P.D. and J. Badrick

I RECENTLY started writing a program for home accounting, and this was when my problems arose – my Atari 800XL doesn't have a pound sign on the keyboard. So I decided to write a routine that would redefine a character that I don't use very often. I chose the exclamation mark, as this will not interfere with my accounts program.

What you must remember is that after each change of graphics mode or if you press System Reset you must re-run the program because the pound sign will have gone back to being an exclamation mark. I found that the easiest answer to this was to use the program as a subroutine within my accounts program, and I simply go to it every time I need it – but remember to place a Return after it.

The program can also be used to convert the exclamation mark into any other character you require by simply altering the data statements.

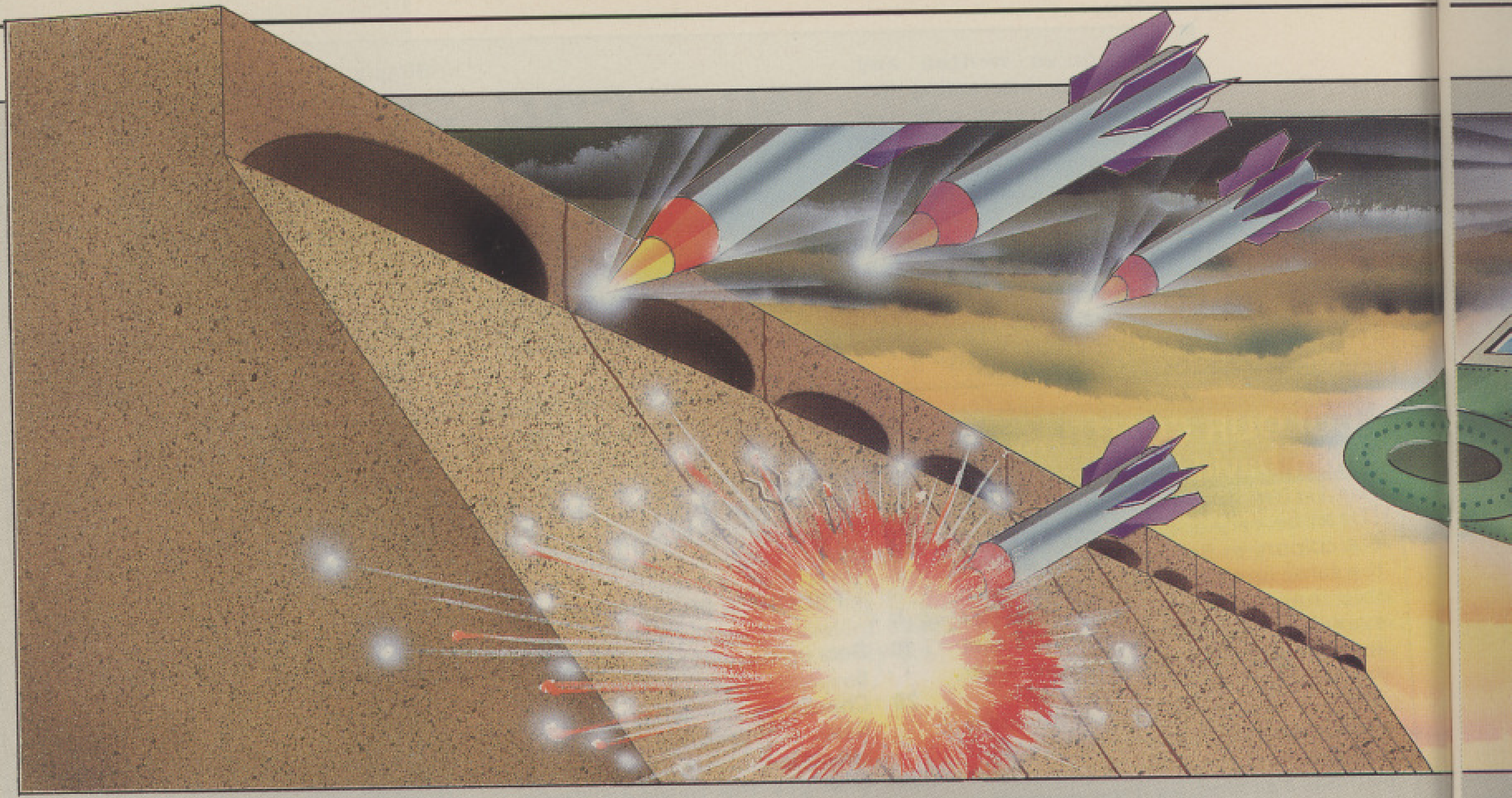
PROGRAM BREAKDOWN

- **1** Prints a message to show the character set being moved into ram.
- **2** Finds the top of memory and steps back eight pages.
- **3** Puts the rom character set into ram. This can be seen happening when the program is first run.
- **4** Finds the start of the eight-byte data for the exclamation mark and pokes in the data for the pound sign.
- **5** Data statements for the pound sign.

```
1 ? CHR$(125):? :? "PLEASE WAIT":? "WH
ILE I CHANGE MY EXCLAMATION MARK":? "T
O A POUND SIGN"
2 RAMTOP=PEEK(106)-8:POKE 756,RAMTOP
3 FOR X=0 TO 1023:POKE RAMTOP*256+X,PE
EK(57344+X):NEXT X
4 LOC=RAMTOP*256+8:FOR X=0 TO 7:READ B
YTE:POKE LOC+X,BYTE:NEXT X
5 DATA 0,28,54,48,124,50,124,0
```

Get it right!

```
1 5CS (H)
2 8CL (N)
3 A90 (5)
4 WLF (N)
5 HN9 (W)
```



DAM TROUBLE

By
MICHAEL A. BAXTER

ONCE again mankind – or village kind – is crying out for your help. Apparently some time ago an obscure individual by the name of Mustapha Drink – or Mr.D – decided to gain control of the Federation for the Control of Water Supplies.

However, the Federation refused his cash offer to buy them out, which left a non too pleased Mr.D in a stinking mood.

This was when he decided that if you can't join them, beat them. So he decided to destroy all the Federation reservoirs and cause chaos throughout the land. Millions of people will be very upset when they get up in the morning, grab their tooth brush, turn on their taps and nothing comes out.

Now spare a thought for the villagers of Floodsville. They face the dubious honour of living in the only place in the country with a surplus of water – sited next to a huge dam holding back around 500 million gallons.

But as luck would have it – and doesn't it always – you stumble across a £16 million helicopter gunship. Using this you may be able to destroy the missiles that are heading towards the Floodsville dam and prevent the impending disaster.

So now the scene is set – only you stand between the missiles and an early bath for the village.

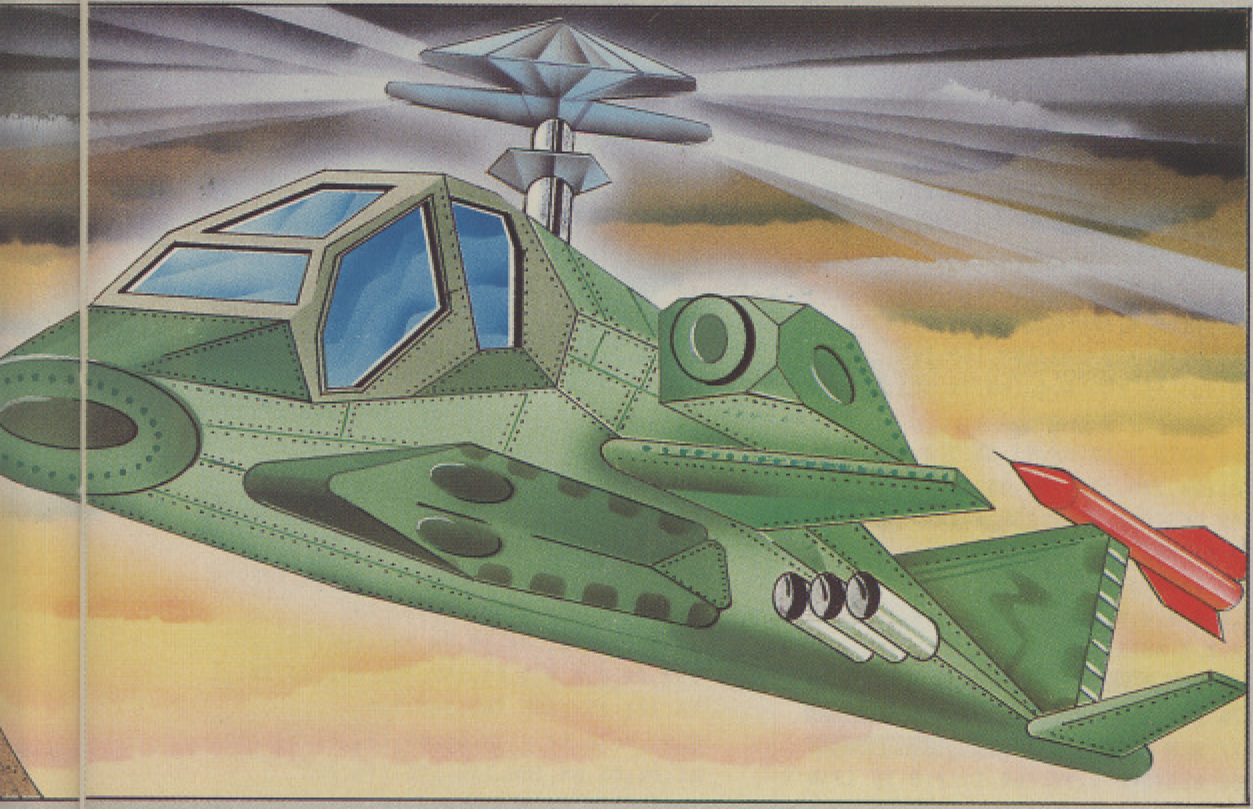
Type in the listing, remembering to check it with Get it Right! and save it to tape or disc before running it. Be especially careful when entering lines 1000 to 2403 as these contain a large amount of machine code.

Three difficulty levels are incorporated, and you make your choice using the Select key. The game ends if the incoming enemy missiles manage to blow a hole through the dam or if all your three helicopters have been destroyed.

Each wave is progressively harder than the last – the enemy missiles get faster and your helicopter is positioned further away from the dam, giving you less time to react. Remember, Floodsville relies on you.

PROGRAM BREAKDOWN

10 – 12	Initialise variables and strings
20 – 25	Set wave parameters and clear all collision detection registers
50 – 70	Main program loop controlling collision detection and movement of missiles
100 – 110	Move helicopter missile
150 – 157	Randomly select a new shape and position for the next enemy missile
200 – 250	Successful end of wave and bonus routine
300 – 330	Collapsing dam sequence and sound. Check for a new high score
400 – 480	Helicopter explosion, decrement lives and check for end of game
500	Clear all sound channels
1000 – 1050	Allocate a safe area of ram for the player missile graphics and initialise it
2000 – 2160	Install the vertical blank interrupt routine to control the helicopter, animation of the rotor blades and enemy gunfire
2165 – 2167	Set up new screen display list
2180 – 2195	Set up a display list interrupt to change the colours
2200 – 2403	Allocate another area of ram for the new character set and define the new graphics
5000 – 7001	Draw game screen, select skill level and start the game



VARIABLES

N to N10	Constants 0–10 used for speed reasons
WAVE	Wave number
LEV	Skill level
B$	String containing graphics for enemy missiles
SC, SC$	Score
HI, HI$	High score
LI, LI$	Lives remaining
CLEAR	Clear collision registers location
MISX	Helicopter missile X position
MHIT	Helicopter hit by missile collision detector
BX, BY	Enemy missile screen coordinates
MOVE$	Contains machine code memory move routine
VBIN$	Contains machine code to start the VBI routine
A, G	General purpose variables

```
1 REM *********************
2 REM *    DAM TROUBLE    *
3 REM * BY MICHAEL BAXTER *
4 REM *   (c)ATARI USER   *
5 REM *********************
10 N=0:N1=1:N2=2:N3=3:N4=4:N5=5:N6=6:N
7=7:N8=8:N9=9:N10=10:BM=37:BY=10:DIST=
0.8:WAVE=N1:LEV=N1
11 COM MOVE$(32),B$(N3),SC$(N6),HI$(N6
),LI$(N8),W$(3):B$="FJ ":MHIT=53254:HH
IT=53252:CLEAR=53278:MISX=53250
12 COM VBIN$(14):VBIN$="h█/█♥▜\ \▣♦":H
I$="0":SC$=HI$:POKE 201,N7:BHIT=53263
13 GOTO 1000
20 LI=N4:WAVE=N1
24 SOUND N,52,N4,N4:POKE CLEAR,N:COLOR
 32:PLOT 30,N
25 FOR G=N1 TO COUNT:POSITION N9+G,N:?
 "€)":NEXT G:W$=STR$(WAVE):POSITION N8
-LEN(W$),N:? W$:TRAP 300
27 REM  Main Program Loop Starts Here
50 IF STRIG(N)=N AND  NOT MSL THEN MSL
=N1:MX=HX+16:YM=PEEK(205):POKE MPL+YM,
170:DIST=DIST+0.1
55 IF MSL THEN GOSUB 100
60 BM=BM-DIST:BX=INT(BM):LOCATE BX-N1,
BY,Z:IF Z=37 THEN 150
61 POSITION BX,BY:? B$;:SOUND N3,BX,MS
O,N4
62 IF PEEK(MHIT) THEN 151
63 IF PEEK(HHIT) OR (PEEK(BHIT)<>N AND
 PEEK(BHIT)<>N4) THEN 400
70 GOTO 50
99 REM  Move Helecopter Missile
100 MX=MX+N6:POKE MISX,MX:SOUND N1,MX,
N,N4:IF MX>210 THEN POKE MPL+YM,N:MSL=
N:SOUND N1,N,N,N:DIST=DIST-0.1
110 RETURN
148 REM  Clear Old Enemy Missile,
149 REM  Choose New Co-ordinates
150 POSITION BX-N1,BY:? "▣▣";:A=SIN(1)
:POSITION BX-N1,BY:? ")    ";:GOTO 154
151 POSITION BX,BY:? "▣";:A=SIN(1):POS
ITION BX,BY:? "   ":POKE 53278,N:MX=21
0:SC=SC+N5:SC$=STR$(SC)
152 POSITION 12-LEN(SC$),20:? SC:COUNT
=COUNT-N1:IF COUNT=N THEN 200
153 POSITION N10+COUNT,N:? " "
154 BM=36:BX=BM:BY=N1+INT(RND(N)*16):Z
=INT(RND(N)*N4):MSO=INT(RND(N)*N7)*N2:
ON Z GOTO 155,156,157
155 B$=")? ":GOTO 61
156 B$="@D ":GOTO 61
157 B$="FJ ":GOTO 61
199 REM  End Of Wave Bonus Routine
200 GOSUB 500:POKE 707,N
202 MX=210:GOSUB 100:WAVE=WAVE+N1:BONU
S=50*LEV:GOSUB 220
204 IF LEV<N3 THEN POSITION N,N:GOSUB
5000
205 IF LEV>N1 AND HX<120 THEN HX=HX+N5
:POKE 53248,HX:POKE 53249,HX+16
206 POSITION BX,BY:? "   ";:BM=37
210 COUNT=20:MSX=210:POKE 707,14:GOTO
24
220 RESTORE 250:FOR G=N1 TO BONUS:SC=S
C+N1:SC$=STR$(SC):READ A:IF A=-N1 THEN
 RESTORE 250:A=N
222 SOUND N,A,N10,N10:POSITION 12-LEN(
SC$),20:? SC;:NEXT G:RETURN
250 DATA 10,30,20,25,22,23,0,23,0,23,0
,23,0,23,0,23,-1
299 REM  Collapse Dam Routine
300 GOSUB 500:FOR G=30 TO 1 STEP -1:Y=
N1+INT(RND(0)*18):X=INT(RND(0)*N3):SOU
ND 0,80,8,15/G
301 POSITION X,Y:? "♦";:NEXT G
302 FOR G=N1 TO 18:POSITION N,G:? "
   ";:NEXT G:GG=N9
305 COLOR 123:FOR G=18 TO 15 STEP -N1:
PLOT N,G:DRAWTO 39,G:A=SIN(G):SOUND N,
N10,8,GG:GG=GG-N3:NEXT G:COLOR 122
306 PLOT N,14:DRAWTO 39,14:COLOR 32:PL
OT N,N1:POKE 707,N:MX=210:GOSUB 100:PO
KE 704,N:POKE 705,N
307 RESTORE 310:POSITION N10,N10
308 FOR G=N1 TO N9:READ A:? CHR$(A+128
);" ";:FOR GG=1 TO 50:NEXT GG:NEXT G
309 FOR G=1 TO 300:NEXT G:POKE 559,N
310 DATA 97,98,99,100,32,101,102,100,1
03
320 IF VAL(SC$)>VAL(HI$) THEN HI$=SC$
330 GOTO 2500
399 REM       Destroy Helecopter
400 X=USR(1740):POSITION BX,BY:? "   "
;:MX=210:GOSUB 100:GOSUB 500:POKE 5324
9,HX+N8:POKE 707,N
```

Turn to Page 20 ▶

◄ From Page 19

```
401 LI=LI-N1
402 IF LI=N3 THEN LI$="▌▙ ▙  "
403 IF LI=N2 THEN LI$="▌▙    "
404 IF LI=N1 THEN LI$="      "
410 GG=PEEK(205):FOR G=75 TO N1 STEP -
N2:POKE PLM+1024+GG+RND(N)*N8,PEEK(537
70)
420 POKE PLM+1280+GG+RND(N)*N8,PEEK(53
770)
425 POKE 704,G/N5:POKE 705,G/N5:SOUND
N,75-G,N8,N8:SOUND N1,PEEK(53770),N8,N
6
430 NEXT G:GOSUB 500
460 Z=USR(1750,PLM,1024):IF LI=N THEN
300
470 POKE 53248,HX:POKE 53249,HX+16:POK
E 53256,1:POKE 704,10:POKE 705,10:POKE
 205,GG:POKE 206,N2:X=USR(ADR(VBIN$))
480 POKE 707,N8:POKE 706,N8:POKE CLEAR
,N:POSITION 30,22:? LI$;:SOUND N,52,N4
,N6:GOTO 154
499 REM  Clear All 4 Sound Channels 
500 FOR G=N TO N3:SOUND G,N,N,N:NEXT G
:RETURN
999 REM  Clear Player Missile Memory 
1000 POKE 559,N:GOSUB 2200:PM=PEEK(106
)-16:GRAPHICS N:POKE 559,N:POKE 54279,
PM:PLM=256*PM:POKE 756,204
1010 RESTORE 1015:FOR I=1740 TO 1791:R
EAD A:POKE I,A:NEXT I
1015 DATA 104,160,98,162,228,169,7,76,
92,228,104,104,133,204,104,133,203
1020 DATA 104,133,206,104,133,206,166,
206,160,0,169,0,145,203,136,208,251,23
0,204
1030 DATA 202,48,6,208,244,164,205,208
,240,198,204,160,0,145,203,96
1040 Z=USR(1750,PLM,2048):MPL=PLM+1536
+N7
1050 POKE 53277,N3:POKE 53278,N:POKE 5
3248,HX:POKE 53256,N1:POKE 623,N4:POKE
 205,100
1998 REM    Vertical Blank Interrupt  
1999 REM To Move & Animate Helecopter
2000 IF PEEK(1536)=173 THEN 2500
2001 RESTORE 2100:FOR I=1536 TO 1673:R
EAD A:POKE I,A:NEXT I
2002 ADDR=PLM+1024:HI=INT(ADDR/256):LO
=ADDR-256*HI:POKE 1591,LO:POKE 1592,HI
2003 ADDR=PLM+1280:HI=INT(ADDR/256):LO
=ADDR-256*HI:POKE 1597,LO:POKE 1598,HI
2004 ADDR=PLM+1830:HI=INT(ADDR/256):LO
=ADDR-256*HI:POKE 1623,LO:POKE 1624,HI
:POKE 1642,LO:POKE 1643,HI
2005 ADDR=PLM+1842:HI=INT(ADDR/256):LO
=ADDR-256*HI:POKE 1626,LO:POKE 1627,HI
:POKE 1647,LO:POKE 1648,HI
2006 ADDR=PLM+1864:HI=INT(ADDR/256):LO
=ADDR-256*HI:POKE 1629,LO:POKE 1630,HI
:POKE 1652,LO:POKE 1653,HI
2100 DATA 173,130,6,73,255,141,130,6,1
73,121,6,73,15,141,121,6,173,120,2,201
2110 DATA 14,240,6,201,13,240,12,208,1
8,165,205,201,42,144,12,198,205,208,8,
165
2120 DATA 205,201,165,176,2,230,205,16
2,0,164,205,189,120,6,153,0,0,189,129,
6
2130 DATA 153,0,0,200,232,224,9,208,23
8,165,206,234,233,2,133,206,141,3,208,
240
2140 DATA 3,76,98,228,164,207,153,000,
000,153,0,0,153,0,0,173,10,210,41,120
2150 DATA 133,207,168,169,128,153,000,
000,169,16,153,0,0,169,32,153,0,0,208,
217
2160 DATA 0,15,64,99,63,7,3,1,0,0,255,
128,224,248,132,254,252,0
2165 RESTORE 2167:FOR I=1675 TO 1709:R
EAD A:POKE I,A:NEXT I
2167 DATA 112,112,80,67,0,0,16,4,4,4,4
,4,4,4,4,4,4,4,4,4,4,4,4,4,4,144,80,
2,2,2,2,65,114,6
2175 REM  Display List Interrupt To 
2176 REM  Change Screen Colours On  
2177 REM      The Last Four Lines    
2180 RESTORE 2190:FOR I=1710 TO 1730:R
EAD A:POKE I,A:NEXT I
2190 DATA 72,169,8,141,10,212,141,26,2
08,169,8,141,24,208,169,12,141,23,208,
104,64
2195 GOTO 2500
2199 REM  Define New Character Set 
2200 G=PEEK(106)-N8:POKE 106,G:IF PEEK
(1735) THEN RETURN
2201 RESTORE 2210:FOR I=1 TO 32:READ A
:MOVE$(I)=CHR$(A):NEXT I
2210 DATA 104,104,133,204,104,133,203,
104,133,206,104,133,205,162,4,160,0,17
7,203,145,205,136,208,249,230,204,230
2211 DATA 206,202,208,240,96
2220 G=G-N8:SET=G:G=SET*256
2230 Z=USR(ADR(MOVE$),57344,G)
2240 TRAP 2243:RESTORE 2300
2242 READ G:G=G*N8:FOR I=G TO G+N7:REA
D A:POKE SET*256+I,A:NEXT I:GOTO 2242
2243 POKE 1735,SET:RETURN
2300 DATA 65,0,0,127,127,127,120,120,1
20,66,0,0,225,243,243,243,243,243
2305 DATA 67,0,0,255,255,255,199,199,1
99,68,0,0,30,159,159,159,159,159
2310 DATA 69,0,0,15,31,191,255,255,255
,70,0,0,0,0,48,48,48,48
2315 DATA 71,120,120,120,112,119,119,1
19,7,72,243,243,243,0,255,255,255,255
2320 DATA 73,255,255,199,7,231,231,231
,224,74,159,158,158,158,158,158,158,0
2325 DATA 75,255,239,79,15,15,15,15,0,
76,48,48,48,48,48,48,48,48
2330 DATA 77,60,60,60,60,60,60,60,60,7
8,0,126,254,254,224,224,224,224
2335 DATA 79,0,60,126,102,102,102,126,
60,80,0,119,119,119,119,127,127,62
2340 DATA 81,48,62,63,51,51,51,63,62,8
2,48,49,51,51,51,51,51,49
2345 DATA 83,0,248,248,128,224,128,248
,248,84,60,60,24,0,0,24,24,0
2350 DATA 51,0,62,96,60,6,6,124,0,39,0
0,62,96,96,102,102,62,0
2355 DATA 35,0,62,96,96,96,96,62,0,46,
0,124,102,102,102,102,102,0
2360 DATA 89,0,15,192,99,63,1,0,0,90,0
,254,64,240,140,254,252,0
2365 DATA 33,0,60,102,102,126,102,102,
0,58,0,124,102,108,108,102,99,0
2370 DATA 7,0,24,24,48,0,0,0,0,16,0,60
,102,102,102,102,60,0,23,0,126,6,6,6,6
,6,0
2375 DATA 124,102,102,102,102,102,102,
102,102,13,0,255,255,0,0,255,255,0
2380 DATA 1,192,192,192,192,192,192,19
2,192,3,240,240,240,240,240,240,240,24
0
2385 DATA 4,252,252,252,252,252,252,25
2,252,5,255,255,255,255,255,255,255,25
5
2386 DATA 6,170,170,170,170,170,170,17
0,170,8,0,0,0,0,0,0,0,34
2390 DATA 9,240,192,0,0,0,0,192,240,10
,5,21,85,255,204,204,207,207
2395 DATA 11,64,80,84,252,204,204,252,
252,12,0,0,0,0,84,252,252,252,13,252,2
53,253,253,255,243,243,255
2396 DATA 14,0,80,84,85,255,63,63,255,
15,85,85,85,255,195,195,195,255
2397 DATA 26,0,0,0,0,2,10,42,42,27,0,0
,0,0,40,168,170,170,28,170,170,170,42,
4,4,4,4,29,170,170,170,168,16,16,16,16
2398 DATA 30,0,0,63,238,238,63,0,0,31,
15,60,252,252,252,252,60,15,32,194,240
,62,15,15,60,242,192
2399 DATA 36,4,143,60,240,240,188,15,1
31,38,3,12,48,239,239,48,12,3,42,3,12,
12,255,255,12,12,3
2400 DATA 127,0,0,0,85,85,85,85,0,96,2
04,48,15,204,51,204,243,60,123,255,253
,127,255,223,255,253,255
2401 DATA 122,192,243,127,255,223,255,
253,255,97,255,195,192,192,207,195,255
,255,98,60
2402 DATA 255,195,195,255,195,195,195,
99,195,195,255,255,195,195,195,195,100
,255,192,192,252,192,192,255,255,101
2403 DATA 255,195,195,195,195,195,255,
255,102,195,195,195,195,195,195,255,60
,103,252,195,195,255,252,195,195,195,*
2450 REM  Set Values For A New Game 
2500 POKE 82,N:? "↰":POSITION N,N:POKE
 756,PEEK(1735):POKE 752,N1:POKE 1679,
PEEK(88):DIST=0.8:BM=36:BX=BM:HX=70
2501 COUNT=20:POKE 53248,HX:POKE 53249
,HX+16
2502 POKE 1680,PEEK(89):POKE 560,139:P
OKE 561,N6:POKE 512,174:POKE 513,N6:PO
KE 54286,192
2503 Z=USR(1750,PLM,2048):POKE 205,100
:POKE 206,N2:G=USR(ADR(VBIN$)):POKE 70
7,14:POKE 704,12:POKE 705,14
2504 POKE 706,N8:SC=N:SC$="0"
4999 REM  Screen Display,Select Level 
5000 ? "WAVE":? "%%!":? "%%!":? "%%!":
? "%%!"
5005 ? "%%#":? "%%#":? "%%#":? "%%#"
5009 ? "%%$"
5010 ? "%%$"
5011 ? "%%%"
5012 ? "%%%!"
5013 ? "%%%#"
5014 ? "%%%$"
5015 ? "%%%%"
5016 ? "%%%%!"
5017 ? "%%%%#          ,       ;;       :
```

Get it right!

```
;;;"
5018 ? "%%%%$((((:;(*+,,-.(*/+<=*+*+,(
===;;:;((("; 
5019 ? "&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&
&&&&&&&&&&";:IF  NOT COUNT THEN RETURN

5020 ? "→SCORE→00000→→→→├├┤┐//→→→→→→R
EMAINING"
5021 ? ,,"→→◣▲▝→←▘▘"
5022 ? "→HIGH→→00000→→→→→‾▁┼┌─┼→→→→→→
▌▟▟└":POSITION 12-LEN(HI$),22:? HI$
5023 ? ,,"←BY M●BAXTER'86";:POSITION N
5,N:? "000"
5060 POSITION 32,N:? "LEVEL ";LEV:POKE
 559,62
5070 IF PEEK(53279)=N5 THEN LEV=LEV+N1
:FOR G=15 TO N STEP -N1:SOUND N,15,N10
,G:NEXT G:IF LEV=N4 THEN LEV=N1
5080 IF PEEK(53279)=N6 THEN 6000
5090 GOTO 5060
5900 FOR G=0 TO 255:SOUND 0,255,10,10:
SOUND 1,255,10,7:POKE 53768,G:NEXT G
6000 RESTORE 7000:TRAP 20
6020 READ A:SOUND N,A,N10,N10:GOTO 602
0
7000 DATA 100,90,95,85,90,80,85,75,80,
70,75,65,70,60,65,55,60,50,55,45,50,40
,45,35,40,30,35,25,30,20,25,15,20
7001 DATA 10,15,5,10,0,5,0,0
```

1 CAJ (W)	202 91S (2)	999 EK1 (9)	2210 2CJ (7)	2403 ECS (T)
2 CAK (3)	204 TMR (J)	1000 3PG (E)	2211 DYS (R)	2450 DRP (V)
3 CAL (V)	205 AHA (8)	1010 FLA (6)	2220 QPH (Y)	2500 DEK (6)
4 CAM (4)	206 VAG (G)	1015 E8M (L)	2230 UM9 (O)	2501 POJ (K)
5 CAN (W)	210 49D (G)	1020 N1Q (1)	2240 M8M (C)	2502 UMO (C)
10 UJV (J)	220 Y52 (Q)	1030 AVH (U)	2242 JWX (Y)	2503 RU5 (J)
11 9WS (G)	222 RGR (G)	1040 A17 (G)	2243 F5K (N)	2504 NXJ (1)
12 J08 (G)	250 L9S (J)	1050 UGR (2)	2300 F4Y (C)	4999 EWR (5)
13 QFF (G)	299 EJT (T)	1998 EVN (3)	2305 GVA (4)	5000 160 (N)
20 O2P (5)	300 W94 (S)	1999 EWN (2)	2310 YAS (M)	5005 H9S (L)
24 DP8 (6)	301 WJG (V)	2000 RQT (X)	2315 PGE (J)	5009 LYP (H)
25 LQJ (N)	302 235 (A)	2001 F8H (F)	2320 MMS (Q)	5010 LRP (K)
27 DK2 (A)	305 515 (U)	2002 LUF (6)	2325 2ER (X)	5011 LUP (H)
50 W4A (2)	306 SY8 (7)	2003 LKX (8)	2330 9QL (L)	5012 MDP (H)
55 E90 (2)	307 1LF (G)	2004 W1E (U)	2335 AO4 (L)	5013 MGP (H)
60 YOM (4)	308 AEY (Y)	2005 WRS (7)	2340 11L (C)	5014 MJP (H)
61 R67 (1)	309 5Y6 (J)	2006 WWX (4)	2345 9AL (6)	5015 MLP (H)
62 GTF (5)	310 WCT (6)	2100 NHW (G)	2350 Y65 (R)	5016 MVP (J)
63 URM (7)	320 G86 (A)	2110 QJ3 (E)	2355 OCJ (Q)	5017 JUW (E)
70 KKR (F)	330 RG9 (R)	2120 MSO (K)	2360 YNG (4)	5018 FH4 (E)
99 DT9 (W)	399 EJU (K)	2130 Q6A (C)	2365 AN4 (W)	5019 17X (Q)
100 CKH (T)	400 P36 (O)	2140 K1U (P)	2370 PUU (P)	5020 5SC (E)
110 RA5 (K)	401 RCJ (D)	2150 QC7 (X)	2375 9SY (A)	5021 SWM (3)
148 DUS (V)	402 FQS (E)	2160 VX8 (M)	2380 SKL (G)	5022 KU2 (G)
149 DWS (K)	403 HOS (X)	2165 G43 (F)	2385 RCL (C)	5023 M2Q (5)
150 KLW (1)	404 H2E (4)	2167 FX8 (3)	2386 OU3 (F)	5060 WGU (1)
151 3UC (8)	410 S11 (6)	2175 DNP (7)	2390 841 (6)	5070 VSA (G)
152 CEM (V)	420 JY1 (X)	2176 DPP (3)	2395 USF (N)	5080 TSM (P)
153 W4H (2)	425 KY1 (L)	2177 DQP (7)	2396 D41 (X)	5090 PRO (8)
154 PPJ (A)	430 8X4 (U)	2180 FL2 (7)	2397 EDV (R)	5900 4G1 (U)
155 2HK (8)	460 CNM (X)	2190 XYF (7)	2398 LPU (8)	6000 GLO (R)
156 36M (9)	470 H2P (K)	2195 PVW (Y)	2399 J1H (F)	6020 164 (Y)
157 4OT (9)	480 EDW (O)	2199 DWP (S)	2400 VSM (A)	7000 AA4 (R)
199 EJS (1)	499 EJV (E)	2200 1QN (4)	2401 5G2 (Q)	7001 CRL (5)
200 4QG (G)	500 13W (9)	2201 OH7 (6)	2402 D3M (2)	

This Toolkit is a MUST!

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Programming becomes so much easier when you've got the right tools for the job. With this *Atari User* package you can add TEN new commands to Atari Basic to dramatically improve your performance. *PLUS* your Atari will generate meaningful error messages instead of cryptic numbers.

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CLICK Turns that sometimes annoying keyboard click on or off simply.

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DIR Displays a directory of any drive without having to enter Dos.

VAL Converts numbers between decimal, hexadecimal and binary.

LVAR Gives the name of all used variables and a list of all their occurences.

CHANGE Alters the name of a variable at every occurrence in a program

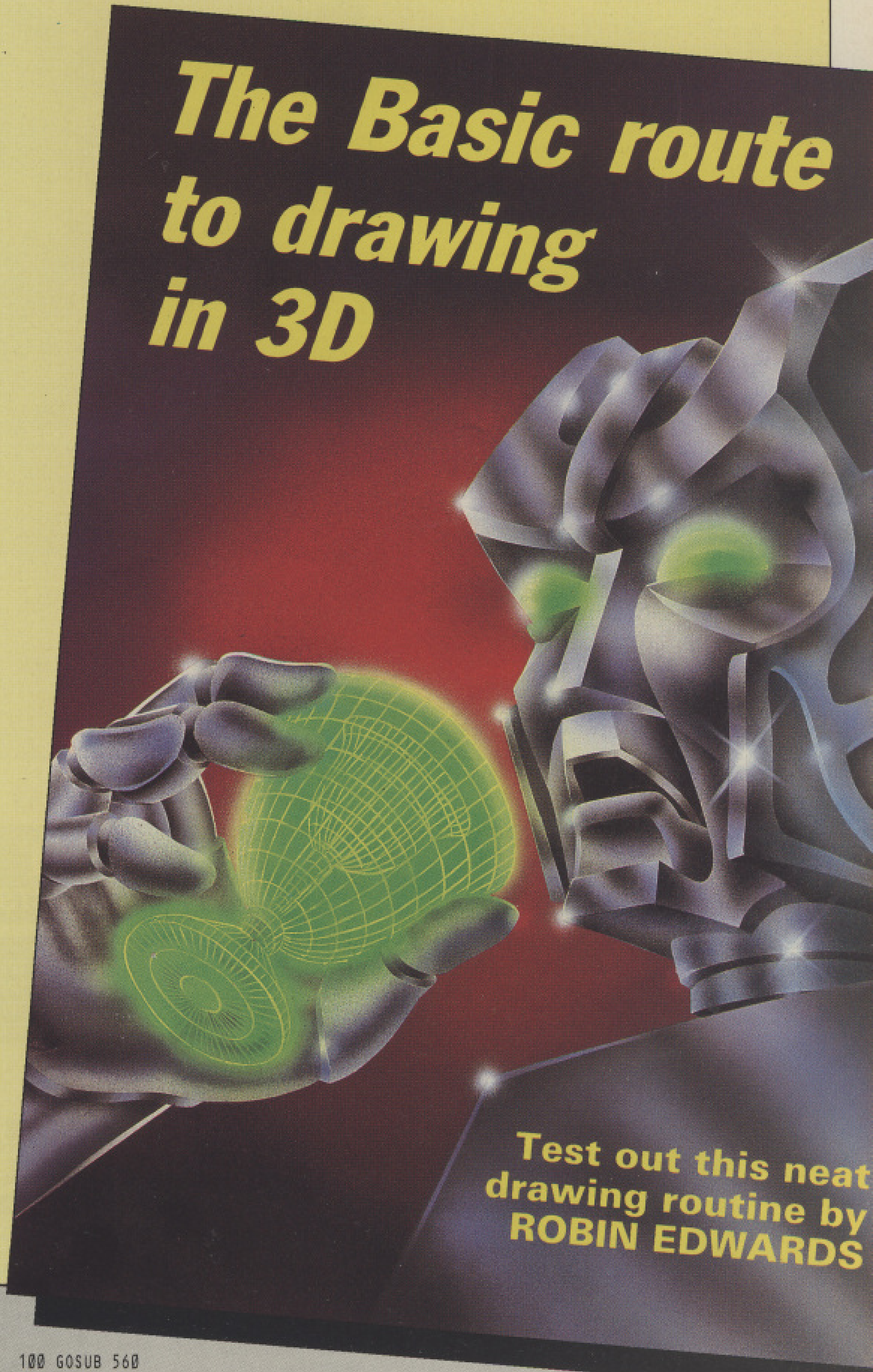
STRIP Removes all REMs and reduces the size of the program.

LISTING Prints and includes the Atari special characters on an Epson printer.

£5.95 tape
£7.95 disc

TO ORDER PLEASE USE THE FORM ON PAGE 61

The Basic route to drawing in 3D



Test out this neat drawing routine by ROBIN EDWARDS

THIS drawing program was first published in the July 1985 issue of *Atari User*. It was written for the Atari ST by Grant Owen, but due to the lack of this sort of software for the 8 bit Atari I decided to convert it.

Although many simple drawing and doodling programs exist, none of them allow you to draw a plan view of a shape and then convert it into a 3D image and view it from various angles.

Type in the listing – remembering to check it using Get it Right! – and then save a copy to tape or disc. When you run it follow the instructions that appear on screen. All the drawing must be done on the right hand side of the screen. To define a shape move the cursor – using the joystick plugged into port one – to a position on the screen and press fire to plot the point.

Now move the cursor to the next point you require, press the button again, and the computer will automatically join these points together. Continue this process until you have finished your flat design. You are allowed to plot a maximum of 30 points on screen – if you wish to plot less than this press Start to finish.

You are then asked how many faces you require the finished drawing to have – the maximum number is 30. If you choose this the drawing will be a smooth and rounded shape – selecting 10 will give a rough profile.

The computer will then work out all the points it needs to draw for the 3D shape. When all the calculations have been completed you are asked to enter the angle you wish to view it from. If you enter 0 the computer will draw a cross-sectional view of the image. I found that 0.25 and 0.5 were the best angles to use.

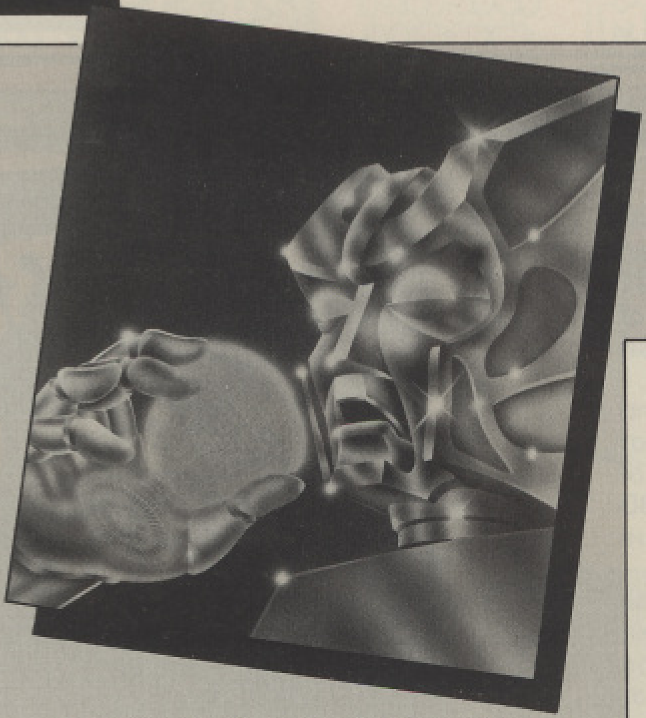
The program was written to work in graphics Mode 8, but with some work it can be made to work in a lower resolution with colour.

```
1 REM 3D DRAWER
2 REM CONVERTED BY ROBIN EDWARDS
3 REM FROM A PROGRAM ORIGINALLY
4 REM WRITTEN BY GRANT OWEN
5 REM (c)ATARI USER
10 RAD
20 GRAPHICS 8:SETCOLOR 2,0,0:POKE 752,
1
30 MPX=200:MPY=20
40 MAXI=30:DIM X(31,31),Y(31,31),Z(31,
31)
50 ? "        WELCOME TO 3D DRAWER":?
60 ? "       PRESS FIRE TO CONTINUE"
70 IF STRIG(0)=1 THEN 70
75 ? CHR$(125)
80 DX=160:DY=96:LET POINT=0:PI=3.14159
26
90 COLOR 1:PLOT 160,1:DRAWTO 160,191
100 GOSUB 560
110 IF STRIG(0)=0 THEN GOSUB 300
120 IF PEEK(53279)=6 THEN GOTO 160
130 DX=MPX:DY=MPY
140 IF POINT>0 THEN GOSUB 740
150 GOTO 100
160 ? "NUMBER OF FACES-";:INPUT F
170 ? "I NOW HAVE TO WORK THIS LOT OUT
"
180 IF F>49 THEN F=49
190 SN=SIN(PI/(F/2))
200 CS=COS(PI/(F/2))
210 FOR L=2 TO F+1
220 IF L=F/2 THEN ? "WELL I'M HALF WAY
"
230 FOR K=1 TO POINT
240 X(K,L)=X(K,L-1)*CS-Z(K,L-1)*SN
250 Y(K,L)=Y(K,L-1)
260 Z(K,L)=Z(K,L-1)*CS+X(K,L-1)*SN
270 NEXT K:NEXT L:GOSUB 420:IF NN=99 T
HEN 50
280 GOSUB 410
290 GRAPHICS 8:SETCOLOR 2,0,0:GOTO 80
300 LET POINT=POINT+1
310 FLAG=1
320 ? POINT;" POINTS SET"
330 X(POINT,1)=DX-160
340 Y(POINT,1)=DY
```

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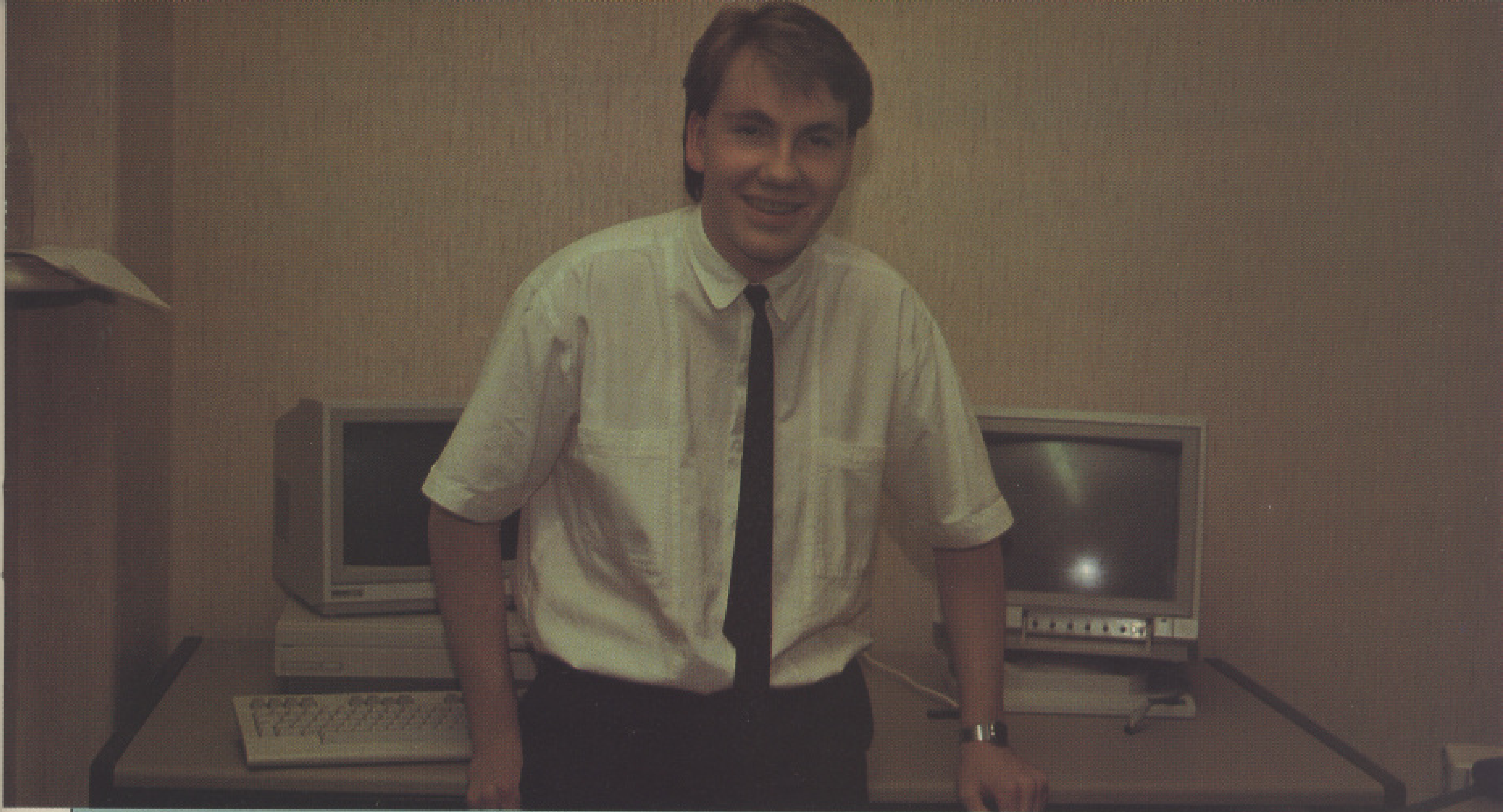
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```
350 Z(POINT,1)=0
360 GX=X(POINT-1,1)+160:GY=Y(POINT-1,1
)
370 GX2=X(POINT,1)+160:GY2=Y(POINT,1)
380 IF POINT>1 THEN PLOT GX,GY:DRAWTO
GX2,GY2
390 IF POINT=MAXI THEN GOTO 160
400 RETURN
410 IF STRIG(0)=0 THEN RETURN
415 GOTO 410
420 ? "INPUT ANGLE ":INPUT NN
430 GRAPHICS 8:SETCOLOR 2,0,0
440 IF NN=99 THEN RETURN
450 FOR L=1 TO F
460 FOR K=2 TO POINT
470 H=160+X(K-1,L)
480 J=Y(K-1,L)-NN*Z(K-1,L)
490 N=160+X(K,L)
500 M=Y(K,L)-NN*Z(K,L)
510 PLOT H,J:DRAWTO N,M
520 PLOT N,M:DRAWTO 160+X(K,L+1),Y(K,L
+1)-NN*Z(K,L+1)
530 NEXT K
540 NEXT L:GOTO 420
550 RETURN
560 S=STICK(0)
570 X2=(S=7)-(S=11):Y2=(S=13)-(S=14):M
PX=MPX+X2*3:MPY=MPY+Y2*3
575 IF MPX<161 OR MPX>318 OR MPY<1 OR
MPY>155 THEN MPX=MPX-X2*3:MPY=MPY-Y2*3
580 PLOT MPX,MPY:PLOT MPX,MPY+1:PLOT M
PX+1,MPY:PLOT MPX+1,MPY+1
585 COLOR 0:PLOT MPX,MPY:PLOT MPX,MPY+
1:PLOT MPX+1,MPY:PLOT MPX+1,MPY+1:COLO
R 1
590 RETURN
740 REM
750 IF MPX=EPX AND MPY=EPY THEN RETURN
760 COLOR 0
770 PLOT X(POINT,1)+160,Y(POINT,1):DRA
WTO EPX,EPY
780 COLOR 1
790 PLOT X(POINT,1)+160,Y(POINT,1):DRA
WTO MPX,MPY800 EPX=MPX:EPY=MPY
800 EPX=MPX:EPY=MPY
810 RETURN
```



Get it right!

1 CAJ (W)	210 OFE (E)	460 CM6 (D)
2 CAK (3)	220 OVE (G)	470 YYV (1)
3 CAL (V)	230 C64 (C)	480 D91 (S)
4 CAM (4)	240 YPA (K)	490 U7F (V)
5 CAN (W)	250 2SY (O)	500 63T (3)
10 D91 (O)	260 OOX (4)	510 FUF (2)
20 5JR (Y)	270 LW4 (3)	520 AXU (G)
30 U4C (2)	280 PUK (P)	530 P35 (9)
40 2NL (9)	290 D21 (A)	540 7R5 (3)
50 YDU (K)	300 HJT (4)	550 RT9 (E)
60 81Q (X)	310 KF2 (G)	560 VHK (7)
70 GEQ (7)	320 JF7 (P)	570 LK6 (A)
75 PWG (R)	330 9P6 (H)	575 NG7 (W)
80 8TR (U)	340 XPQ (U)	580 4DC (L)
90 6U3 (C)	350 XQ6 (J)	585 2PF (X)
100 P2J (S)	360 GLM (2)	590 SA9 (P)
110 Y1F (P)	370 4UJ (5)	740 DCY (V)
120 UUN (P)	380 1X6 (W)	750 LN9 (P)
130 YSM (M)	390 Y7M (Y)	760 LYY (W)
140 SHH (7)	400 R68 (K)	770 M4J (3)
150 QJ7 (Q)	410 YY5 (7)	780 M9Y (G)
160 YUU (E)	415 QSA (L)	790 MWJ (M)
170 CKT (K)	420 W6U (H)	800 GEA (Y)
180 9HU (4)	430 UY5 (2)	810 RAD (X)
190 87Q (2)	440 8Y2 (M)	
200 7H6 (2)	450 TQ4 (D)	



Brian Jobling, one of the founders of Zeppelin Games and author of Speed Ace

Visions of success...

Neil Fawcett takes a look at a new software company, a new game and its seasoned author

IN an ever-expanding software market it is always pleasing to see a new product arrive in the office – and Speed Ace certainly had us all buzzing.

It is the first release for the Atari by a newly formed company, Zeppelin Games, which decided to enter the world of budget price software. If all its products are as good as this one it can look to a prosperous future.

The game is a one or two player motorcycle simulation which uses a split screen display similar to the old Pitstop II game. After playing it for a while I was intrigued to find out why a full price product of this calibre is priced at only £2.99. So I packed my bag and headed for Newcastle-on-Tyne to talk to the author Brian Jobling, who is also one of the founders of the company.

When you meet Brian the first thing that strikes you is his age. At 19 he has already chalked up an impressive list of games on various computer formats. His successes on the Atari came about while he was working for Tynesoft – Winter Olympics, Phantom, Who Dares Wins II and Mousetrap.

I summise that it was the success of these – especially Winter Olympics which sold over 4,000 copies in its first month – that allowed him to buy his Porsche at the tender age of 18.

When I asked Brian why the game was so cheap his answer was very simple: Zeppelin want to show that high quality software can be produced and sold at a budget price. It has certainly done that with Speed Ace. Unlike most budget companies who bring out up to 10 titles a month of an average quality, Zeppelin will only produce around two or three games a month. But because more time is spent on each, the quality will be very high.

Zeppelin was formed on 30 September last year by Derek Brewster, Martin O'Donnell and Brian Jobling. They have their own in-house programmers and various free-lance writers and, as well as supporting the Atari they produce budget games for other micros.

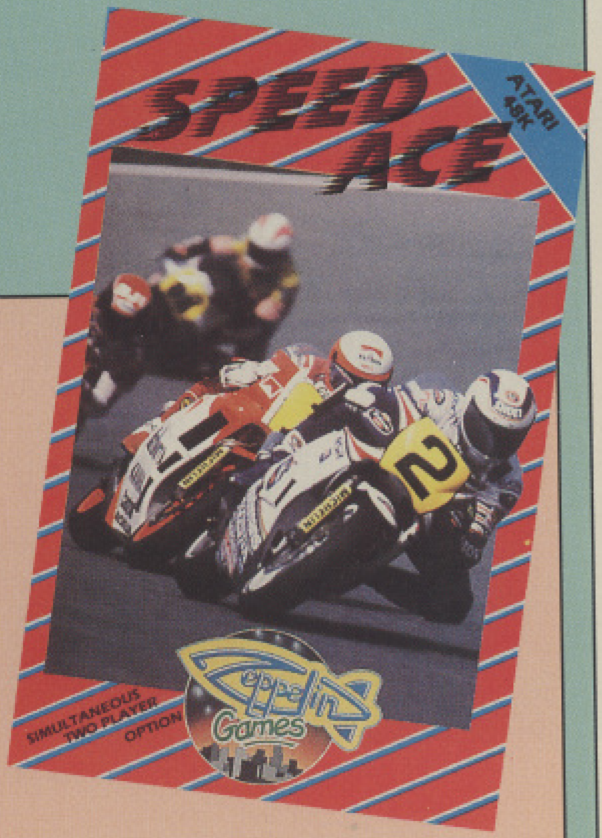
Derek is the man who got Brian interested in the world of programming. He was converting games for the Amstrad CPC, but since then Brian has moved on to better things. Derek used to be an editor on a computer magazine.

With all this experience the company has the potential to succeed, but what really sells the products is their

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quality. The packaging has been produced in a very professional way. Original artwork and eye-catching style makes the product jump of the shelf at you. So, best of luck Zeppelin and keep those quality products coming in.



NEW RELEASE

As with most budget releases, Speed Ace is only available on cassette. Being the first release for Zeppelin, they will be hoping for a huge success.

When loaded you are presented with the main menu from which to select your race options.

If you choose a one player game you will race against 19 other computer-controlled riders on a full screen. The scrolling is very fast and simulated speeds of up to 192 kph are possible.

In two player mode you can race against a friend using a joystick plugged into port two. The screen is split into two each half giving an independent view, with the two of you being the only riders. This technique slows the game down a little, but racing against someone other than the computer is great fun.

You can choose between nine different race tracks with from one to nine laps on each. The circuits include Brands Hatch, Silverstone, Jarama, Paul Ricard and Daytona. The inlay card says that the computer tracks are identical to the originals, but not knowing them personally I can't dispute it – although Brian assures me they are.

To control your bike, push forward on the joystick to accelerate and pull back to slow down. If you collide with another rider it results in you temporarily losing control and it will take you a little time to regain speed.

Leaving the road or touching the kerb also slows you down dramatically, so take the bends at a comfortable speed and it will pay off in the long run. I found that under 140 kph was a safe speed for bends.

After a race you are presented with the score table which shows the best time for that particular track and the time you have just achieved. It also shows what position you finished the race and the best position you achieved.

The graphics are superb and the scrolling exceptionally well executed. Sound effects could be better – a catchy little tune on the main menu would have been nice. Having said that the constant sound of the engine revving and the crunch as you grate your legs into the ground as you go round a corner are adequate.

The feature I really liked was the way the bike leans to one side as it goes round corners; this is smoothly done and adds the finishing touch to a super motorcycle game – the first of its type that I have seen for the 8 bit Atari's.

At £2.99 this game is a bargain and must be a winner for Zeppelin and Atari computers alike. I will be very surprised if it doesn't turn out to be one of the best sellers in 1988.

COMING SOON

Zybex will be the next release by Zeppelin for the Atari 8 bit and although the version I saw wasn't finished, what I did see was superb. It promises to astound Atari games players with its quality and addictiveness.

The game involves two rebels – Rinser and Cassalana – who have been sent on an almost suicidal mission to escape the nightmare of Death Row.

To escape execution they must go to various strange worlds in the Czoken system and fight weird and deadly aliens. From each of these planets you must collect a teleport crystal. Each crystal gives you access to another world until you reach the restricted levels and face the ultimate challenge – the Zybex itself.

If you obtain this it will ensure that your captors remove death rings from your necks.

To help you with the mission you are given the Orbit weapon with power level one. This can be increased as the game goes on by picking up weapons of the same type.

There are others that you can get and these include the Rail Gun, the Wall, the 8-Way and the Pulse. The game is described as having a simultaneous two player option – two players on screen at the same time. Very nice to watch.

The graphics are stunning and the music was some of the best ever on a game for the Atari, and believe me I've heard a lot.

The graphics for the backdrops are some of most original I have seen. A lot of thought has been put into designing the aliens you fight and the weapons that you use. All in all this game is a credit to Zeppelin.



NEWS...NE

Service has new specialist role

ONE of the country's leading learned societies has joined MicroLink.

The British Psychological Society has nearly 12,000 members and is involved with government, the health and education services, academic institutions and other organisations here and abroad.

Last year its charter was changed to allow it to maintain a register of chartered psychologists which the general public will soon be able to consult.

This gives the country a new breed of chartered specialists whose education and professional conduct the BPS oversees.

The society is no stranger to the benefits of electronic mail. For some time its members who work in academic institutions have been communicating via JANET, the Joint Academic Network.

By joining a more widely-used service like MicroLink, BPS members working in all areas of psychology can now communicate faster and more efficiently with the Society's offices in Leicester.

In addition the society's extensive business activities, which include publications and software, will be enhanced by MicroLink Email and telex facilities.

A bulletin board for business

MICROLINK has joined forces with the University College of Swansea to provide a unique electronic bulletin board for businesses.

Subscribers can get advice free of charge from experts in various fields, and discuss business problems with others who may have experienced similar difficulties.

As well as being instant and free, this access to professional expertise comes with no strings attached, no axe to grind and no commercial bias.

The wide range of business sectors covered includes legal matters, exporting, industrial relations, management, market research, personnel and training, statistical and systems analysis.

Expertise is also supplied in the areas of computing and computer systems, electrical and electronic engineering, expert systems and artificial intelligence, and mechanical engineering.

Users of the Business Bulletin Board can browse through the messages and replies for items of interest.

All messages are read by the system operators who pass them on to the relevant expert.

Translation back the same day

LANGUAGE expert and Swansea university lecturer Dr June Salmons has started what is probably the world's fastest translation service on MicroLink.

Subscribers who send foreign language documents to her mailbox can get the translated material back the same day – a vast improvement over the post, particularly for businesses.

"Initially I can offer translation facilities in Italian, Spanish and French – but if the demand is there, other European languages can easily be added", said Dr Salmons.

Subscribers can use either the standard service, where the translated document is returned via MicroLink the next day, or the super-fast same day service.

Dr Salmons, a lecturer in Italian, said: "Europe has always been an important area for organisations to develop into. However, barriers are often erected solely because of linguistic difficulties.

"Hopefully, a fast and efficient service like this should make it easier for more firms to enter Europe".

Big cash savings

THE first commercial bulletin board on MicroLink has been launched.

Called LoadLink, it will help Britain's 2,000 removals firms avoid expensive wasted space on their vehicles.

The service provides information about spare capacity – part-loads – available throughout Britain and abroad.

Firms using LoadLink can sell or buy space on part-loaded vehicles, enabling journeys to become more efficient and profitable.

It also enables firms to give their customers better service by accepting small loads that were previously uneconomic.

Grateful for small mercies

by Rouloc



AS I was saying to my great-great-great-grandfather just the other day – we small folk are noted for our longevity you know, despite the fact that we dice with danger and dragons virtually every day of our lives – not a lot new seems to be happening at the moment.

There's usually a post-Christmas lull on the games front and that goes for adventures, too. Still, this year it seems even quieter than ever, but then I probably say the same sort of thing every year.

When you think about it though, not all that many companies are producing adventures these days, even when the market is at its liveliest. Apart from Rainbird, Magnetic Scrolls, Infocom and Level 9, adventure producers seem remarkably thin on the ground.

There's Robico, of course, and even US Gold releases the occasional import – the Ultima and Electronic Novel series spring to mind – but you'd be hard put to think of any others that are still around.

And yet, when you really start to look back over the years, that's the way it has always been. Only a handful of companies have ever gone in for adventures in a big way. We must be grateful for small mercies – as long as we adventurers remain hungry for new quests and challenges, I believe that there will always be software houses willing to satisfy that demand.

The most cheering aspect is that the quality of the adventures being written today is, in most cases, better than ever.

The advent of more powerful and larger memory machines, together with the development of more sophisticated programming techniques, means that we are no longer faced with wrestling with an adventure's vocabulary severely limited by simplistic two-word command structures or bored to distraction by barren descriptions.

For those that like them, many adventures now have superb graphics and some even sound effects.

We've come a long way in a few years and with the prospect of other exciting developments such as CD rom, the future of adventures looks assured.

Now, turning to your letters, what happened to your response to my invitation for you to send in your personal lists of favourite adventures? Not a dicky-bird have I heard! Can it be that none of you have played enough adventures to be able to supply such a list?

I can't believe it – surely most of you have experienced the joys of at least a dozen quests? If so, write in and let me know your favourites in order of preference. I just love comparing my own pet likes and dislikes with those of fellow adventurers, don't you?

Steve Wilson of Tamworth is desperate. "Please, please, please," he writes, "for goodness sake tell me who's the King of the Jungle in Mordon's Quest". Tarzan has spifflicated Steve a hundred times and Steve has wandered around in misery for months trying to discover the answer.

He's going bald with worry and unless someone tells him soon, he's going back to Space Invaders – that shows you just how bad the situation is. I don't know the answer, but for the sake of Steve's health, can someone please supply what he and Tarzan want?

Brian Standing of Port Talbot takes me to task for forgetting what I am supposed to already know about Ultima IV. Similarly, Ron Rainbird from near Crewe asks for my help with the same adventure, noting that I claimed to be an expert on the game.

Well, I'm afraid I have a small confession to make: Like Dr. Who, who regularly undergoes a transition to an entirely new personality, I, too, have undergone a change in recent months.

I am not who I was, if you catch my drift, and I have to admit that my knowledge of Ultima could be written on the head of a match. Now if it's info on Infocom games you're after...

However, Brian has supplied some more help with Ultima IV which I now pass on for the benefit of interested parties. The mandrake can be found either on an island to the east of the Fens of the Dead which are south of

Turn to Page 30 ▶

◀ From Page 29

the Island of Paws or, easier, in the Bloody Plains – look for the marsh symbol.

Mandrake and nightshade can only be gathered at midnight – no moons. Nightshade is found at LAT. J F LONG. C O. The three syllables of the word of passage are VER, AMO and COR making VERAMOCOR – but Brian is not absolutely sure that is the correct order, not having played it for quite a while.

You should stock up on your full quota of spells before entering the chasm since it is an arduous journey to the bottom. The most useful are Heal, Cure, Dispel, Awake, Negate, Sleep and Protection.

Ron would like to know where Buccaneer's Den, Magincia, Nostro, the Runes for Valour and Spirituality and the secret entrance to Hythloth are to be found. He would also like information on how to travel by ship into Lock Gate to see Mentorian for the Gate Travel spell. Can anyone assist?

See you next month.

Hints & tips

THE PAWN
Solution – Part two

From the staircase room, go down to the room with the low ceiling. Then go W then SW to the lounge, get the hard hat and wear it. Search the cushions for the coin, go to the lift and press the button.

Enter the lift, close the door and press the second button then, at the rockface, get the lumps using the trowel. Go back to the lift and press the button, then get the rope.

Return to the grassy plain and buy whisky and beer bottles with coin and chit. Go to the narrow track and climb over the rocks then go to the cavern and find small cave.

Travel N, N to the laboratory, give rice then lumps to the alchemists then examine the tea chest and jars. Drink liquid then cast a spell on the tomes and go NE to store room and get the aerosol. Go SW, NW, W and cross the rope bridge then go NE to the tunnel then N to the room.

Tear paper wall with the trowel and tie the rope to the hook, climb down and knock on the doors and keep on knocking. Give whisky bottle to the porter then go E, D and N to the annexe.

Give the beer bottle to Jerry then go S, E, N and E to hell and ask the devil about the wristband then get the potion bottle. Go to the dragon in the chamber via rope bridge and high ledge.

● *Part three next month.*

Two discs crammed with the most popular programs from your favourite magazine!

These two exciting compilations bring together some of the very best listings from the pages of *Atari User*.

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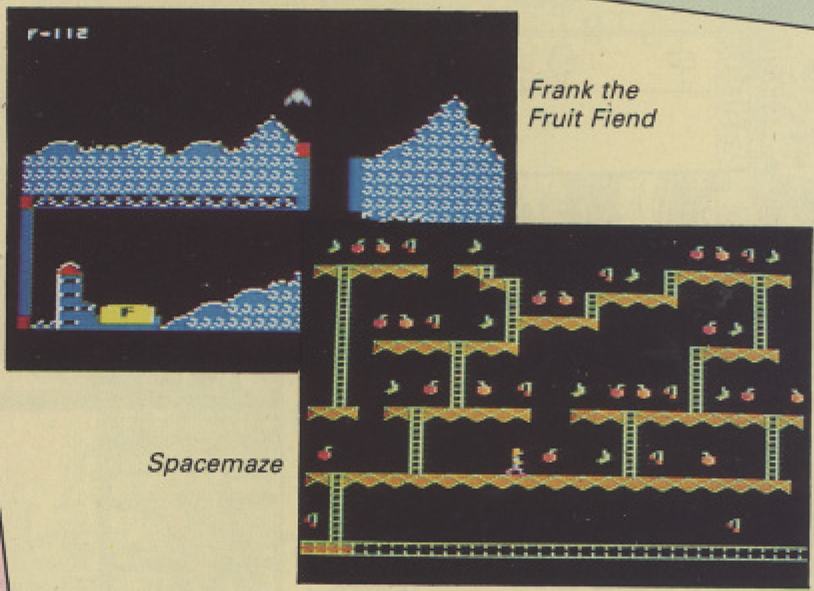
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Spacemaze

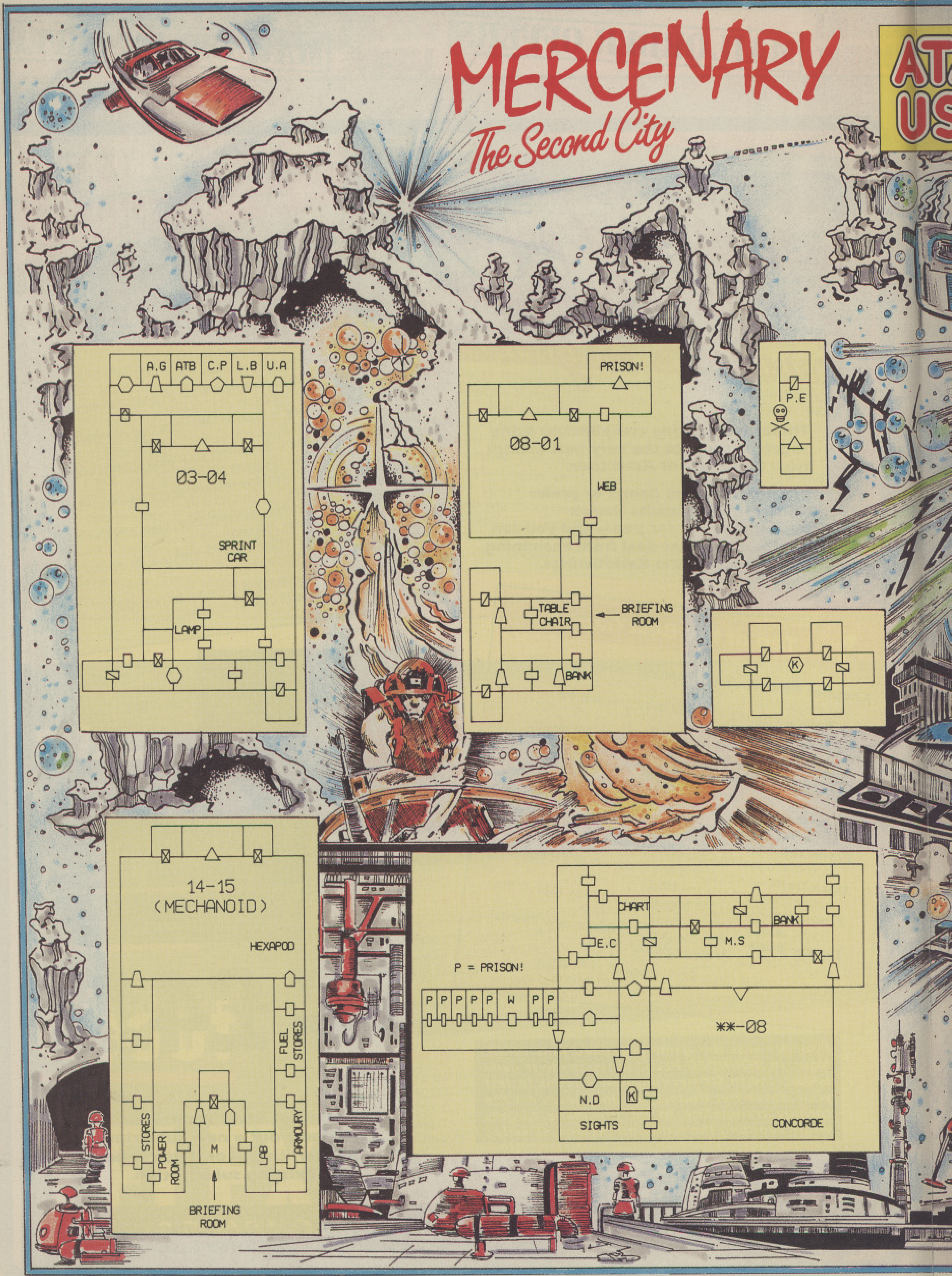
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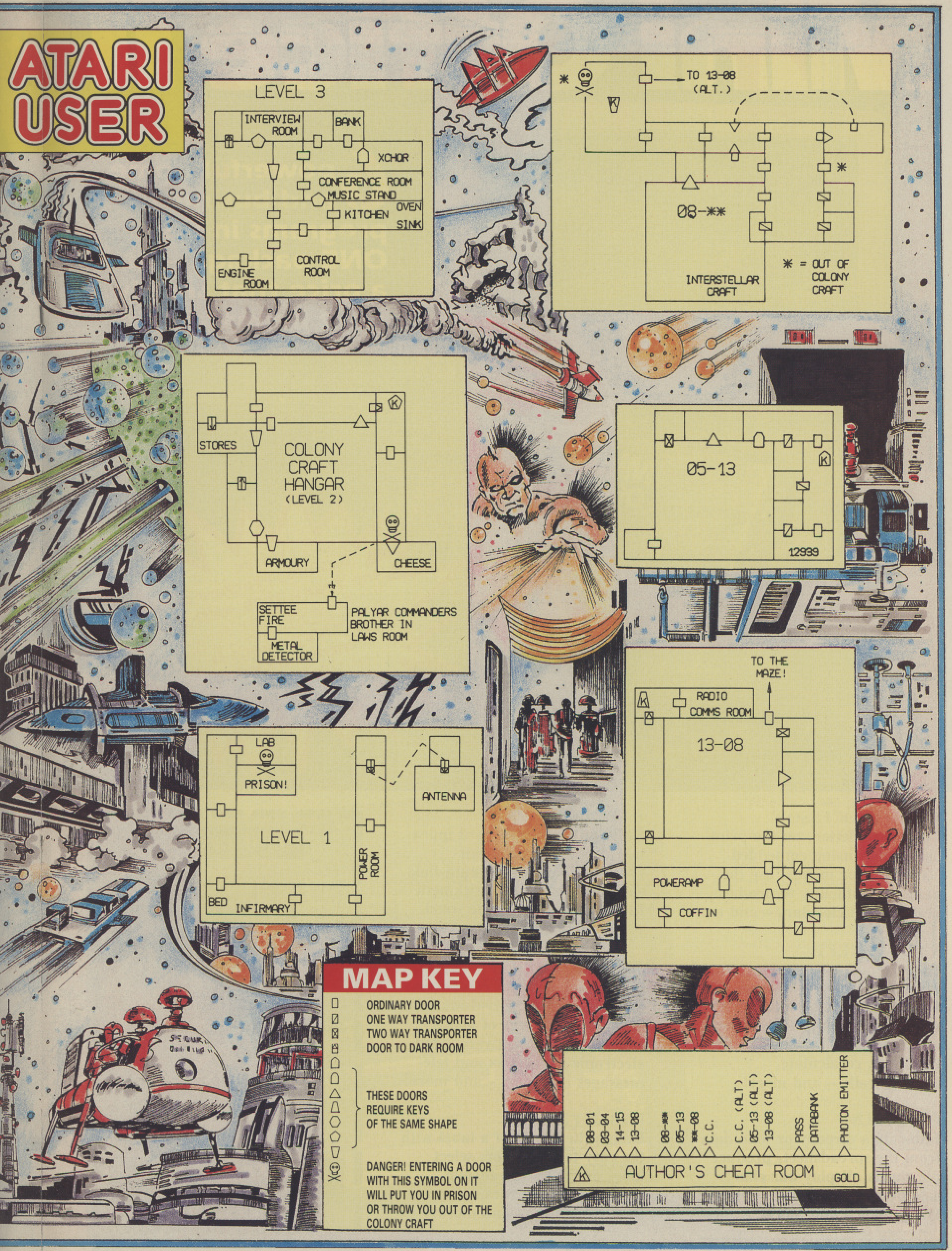
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AT3

Software Scene

Batty but beautiful

Product: Rebound
Supplier: Microvalue/Tynesoft, Addison Industrial Estate, Blaydon, Tyne and Wear NE21 4TE
Price: £3.99 (cassette) £5.99 (disc)
Tel: 091-414 4611

ONE of the main problems the software market suffers from is a lack of originality. At times it appears that programmers simply change the design of the aliens and sell shoot-'em-ups under another name.

Maybe it's time we went back to another old idea and jazz it up a bit and this is exactly what MicroValue has done with it's latest game Rebound. The title screen is very well done, There's no amazing picture, but varying text fonts and colours are used to good effect.

The music is a superb percussion piece that really gets your foot tapping. It goes on for quite a while and changes all the time – not the usual monotonous dirge that some games give.

As you play, the music can be heard in the background – a feature that I like.

The quality of games music seems to be getting better all the time – but that's not really surprising on the Atari machine.

Now on to the game itself. Imagine that you take a tennis court, cut it in half along the net, then place one half at the top of the screen and the other at the bottom.

You then have a bat at each end moving left and right and a ball and build the sides of the court up so the ball can rebound off them. There you have it – sounds very simple doesn't it?

There are three levels of play: One is just right for the novice, but don't try level three unless you have the speed and reactions of Boris Becker.

In one-player mode you face the computer, but the fun really starts when you move to two-player mode and challenge a friend.

The object is to score seven points, or goals, which is done by making your opponent miss the ball so it passes his bat.

You can only score a point when it is your serve and the scores are displayed on a status line that separates the two halves of the court.

When a game is won a whistle blows and you are returned to the title screen.

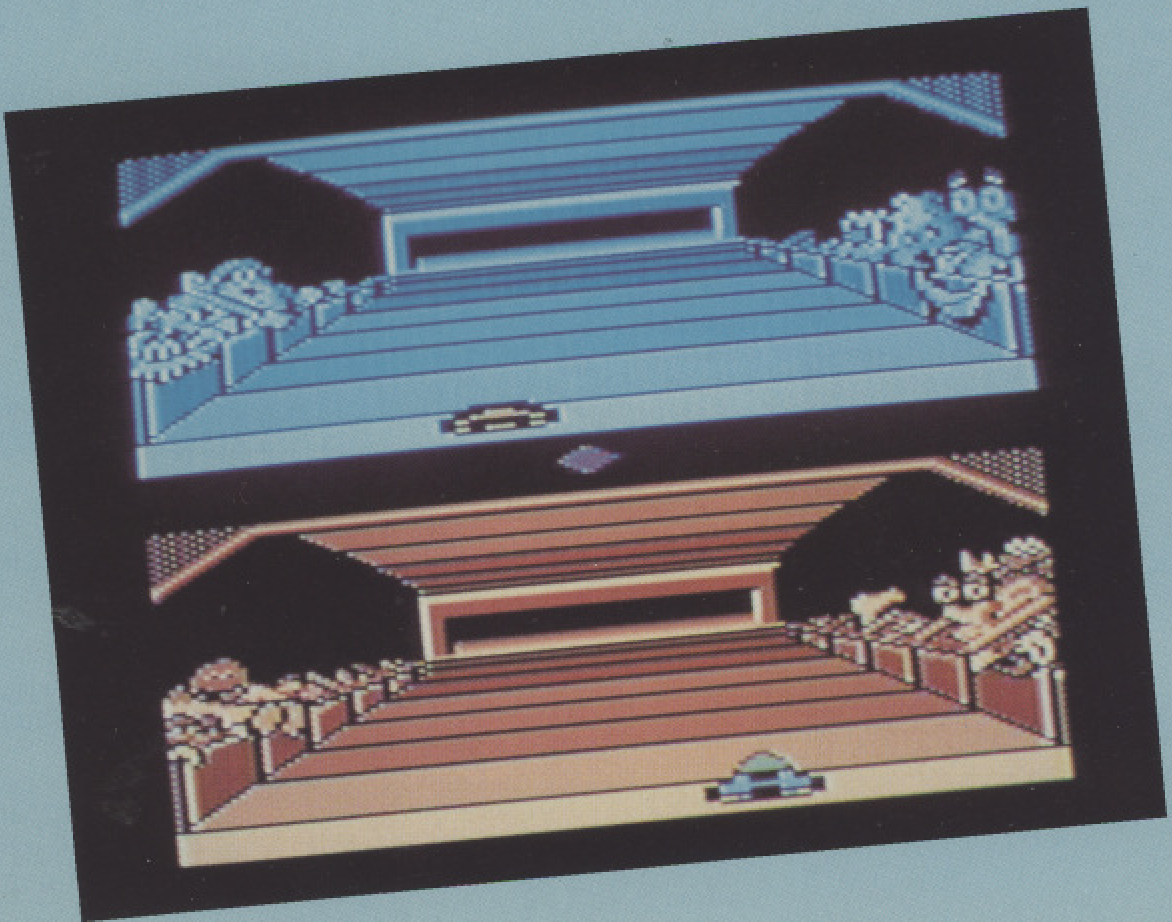
An amusing feature is the animated audience seated on each side of the court. They are the strangest bunch of aliens I have ever seen since the cantina scene in Star Wars.

Whenever the player who they support scores a point they clap, jump up and down and generally squirm around in glee.

The game contains all the features needed to be a winner – smooth scrolling and superb graphics give an overall addictiveness, the animated audience is fun to look at and the music is superb.

Rebound will be released at Easter on Microvalue's Four Great Games – Volume Three. The pack will be worth buying for this game alone. Well done Microvalue – a superb product.

Neil Fawcett



Sound	8
Graphics	7
Playability	8
Value for money	7
Overall	8

Flight of fancy

Product: Swift Spreadsheet
Supplier: Audiogenic, Winchester House, Canning Road, Weeldstone, Harrow HA3 7SJ.
Price: £24.95 (disc)
Tel: 01-861 1166

EVER since the pocket calculator was invented, complicated mathematics has receded. The development of spreadsheet computing or, as some would call it, financial planning, has brought business calculations well within the grasp of everybody's abilities and pocket.

A spreadsheet acts like a blank sheet of paper on which both text and numbers are placed. Numbers form the basis of calculations and if these change, it often causes automatic recalculation of all the results.

Spreadsheets can be used for any calculation – not only financial, but the majority of applications are usually for standard items, such as profit and loss, balance sheets, costing/estimating and analysis of expenditure.

The main benefit, apart from time saved in accurate calculations, is the possibility of *what if* predictions. Just changing a few pieces of data or even editing a formula can alter the forecast of any financial modelling.

Swift originates from the Commodore 64 version of Micro Swift. The disc contains XL and XE versions and the correct one for your computer is loaded automatically when you boot the disc.

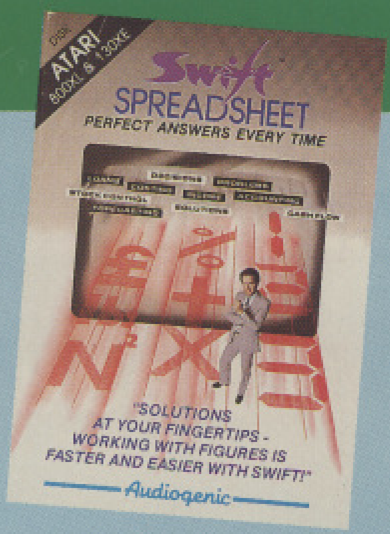
It comes with a 50-page manual covering basic information and gives plenty of examples and two tutorial lessons.

Unfortunately all the commands are laid out for the C64, but there is a separate quick reference card for the Atari indicating which keys to use.

Swift has all the usual features found in spreadsheets together with user-defined screen colours and pop-up menus to aid data input and manipulation.

The size of the spreadsheet allowed by this program depends on the size of the computer's ram, For the XL version there are 6600 cells – 26 columns and 254 rows – and the XE version has 64 columns and 254 rows – 16,256 cells.

To take advantage of the package's many features, the unique pop-up menu system allows you to select commands without having to enter a sequence of special characters.



Many instructions have been grouped together in a logical sequence to further aid data input.

The menus are small windows which overlay about a quarter of the sheet but do not interfere with the data behind.

Some commands have additional menus linked to them, so there is often no need to type in specific instructions – just select the right one and press Start.

Using these menus can make the complicated calculating process structure seem easy to operate – see Figure I.

To move round the spreadsheet, the Control+cursor keys are used for single cell jumps while for bigger moves the Goto key allows you to go directly to any cell.

Entering and editing data is simple – just place your cursor on a cell and type the data in.

Features include the standard preparation of cells for width, numbers, currency signs and decimal places. You can also format a disc from within the program, or see the data in a basic graphical form.

One of the most important parts of any spreadsheet is the ability to be able to relate cell values to others. You do this using formulae.

For example, you can say that the value of D10 is the result of D3 * D6. You can transfer or copy that formula to other cells.

The printer section has some good facilities. You can select the output width and insert printer commands to customise it. All data can be saved to disc.

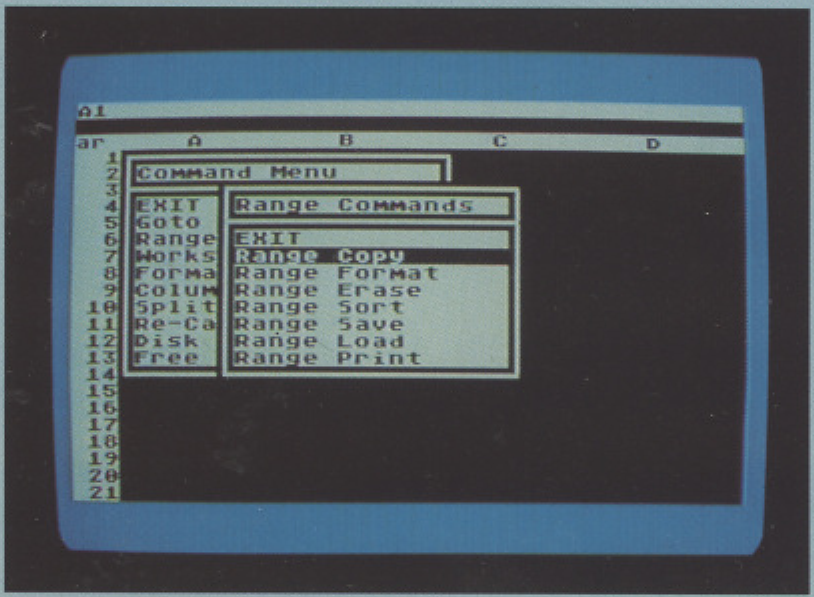
Swift operates effectively, but the programmers have tried too hard to be innovative.

Although the little pop-up menus are impressive, they are difficult to use, but overall using the program is still quite easy.

The tree-like structure of the pop-up menus save you having to memorise complicated commands.

Spreadsheets for 8 bit micros are few and far between, and while Swift may not have the depth of other popular business programs, it has very good capabilities, is adaptable and well suited for beginners to both computing and financial modelling.

Alan Goldsbro



Command Menu

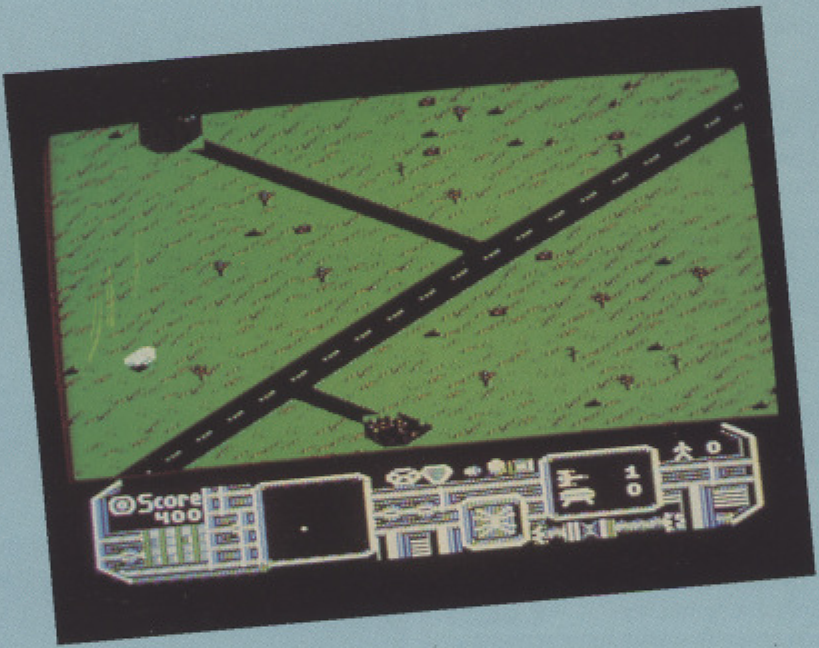
Menu I – Range Command

Menu II – Range Copy
Range Format – Menu III – Exit
Range Erase — Negative Values
Range Sort — Currency Signs
Range Save — ,Commas
Range Load — %Sign
Range Print — Zero suppression
Precision 0 – 8
Plot ***

Figure I: The tree like structure of Swift's pop-up menus

Dodgy diagonal trouble...

Product: Panther
Supplier: Mastertronic, 8-10 Paul Street, London EC2A UJH.
Price: £1.99 (cassette)
Telephone: 01-377 8411



PANTHER, the new budget title from Mastertronic, is a good old-fashioned shoot-'em-up. You are inside a flying saucer and should get hours of entertainment as you disintegrate aliens in a hail of laser fire.

You are the lone remaining pilot – sounds like Battlestar Galactica – in the Federal force and your city, Xenon, is under attack.

Most of the population have left and the remaining few must be picked up and taken to the spaceport on the other side of the city.

Reminiscent of Blue Max-2001, the playfield scrolls right to left diagonally across the screen. This looks good, but it unfortunately prevents half the screen from being used – your movement is restricted to a narrow channel running from corner to corner.

To me this is a sign of lazy programming, as with a little bit of work the entire screen could have been used.

The view of your flying saucer is from above and to the right – hence the scrolling techniques used. Using the joystick, you can move up, down, left and right, within strict limits.

The aim of the game is to survive – which isn't easy – and to rescue stranded people who are taking refuge in triangular shaped bunkers scattered around.



To make life difficult alien fighters constantly buzz the area and take great delight in zapping you – but don't they always?

The terrain is nicely varied and starts with desert – beware of the killer cacti. Don't land on any green bits to pick up survivors because your craft will explode – a handy piece of information that the cassette inlay omits.

Another problem with this level is that some of the aliens are the same colour as the background, making them very difficult to see.

Next you'll come to the deserted city which is laid out in a monotonously symmetrical fashion. After this you arrive at the sea, complete with waves, and very realistic they are too.

Look out for oil platforms as you cross the screen as there could be survivors on them.

After the sea you reach another city and the spaceport. Flying is fun in the city as you try to go in under radar and round the skyscrapers.

Below the main playing area is your saucer's control panel. This displays your score, the number of people you have rescued, how many ships you have left and a radar panel.

The latter shows the position of the bad guys relative to you and is very useful because they can go off the screen and shoot you from behind, whereas you can only shoot them if they are directly in front of you and at the same altitude.

A novel approach I liked was that they call your death and rising from the ashes the Phoenix manoeuvre – you have five of these before the game is over.

A failing is that there is is no real height indicator – you have to guess the height by your shadow and compare it with the alien ships. At least in Blue Max the enemy changes colour when you're at the same altitude.

Another well-implemented feature is the superb background music, although it can get on your nerves after an hour or so. Most of Mastertronic's recent games have been released with some very classy music, let's hope they keep it up.

I was disappointed with some of the graphics.Your ship resembles a strawberry that you have just trodden on – flat and horrible.

The alien craft are just as boring, but a saving grace is that the little people are well animated as they run out of the bunker to your ship.

Despite these minor faults I enjoyed playing Panther. Excellent scrolling and sound effects make it pleasing to look at and hear. For £1.99 you must buy this game for your collection, it's well worth it.

Ruth James

Sound	*7*
Graphics	*6*
Playability	*8*
Value for money	*8*
Overall	*7*

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Your HINTS & TIPS

Mirax Force

IF you are having problems with this fast action shoot-'em-up don't worry – help is at hand. The author, Chris Murray, has built in a cheat mode.

His middle name is Peter and by typing his initials *CPM* at the title screen you will turn off the collision detection for your craft. You can still shoot the alien craft and destroy the super structure of the mother ship, but they can't get you.

I have used this cheat to get all the way through the game and, believe me, some of the later screens are superb. – **Michelle Nixon, London.**

Zaxxon

WHEN you are flying through the second Space Fortress you need to get the heights exactly right for going through the space between the force fields and the wall.

Your height is indicated on the left of the screen as full and half blocks, so here are the heights to fly at: 1.5, 2.5, 0, 1.5, 2.5, 0 and 1.5. – **F. Bowley, Hockley, Essex.**

Ghost Chaser

If you are having problems playing the game and are losing lives fast, type in FANDA and the program will give you extra lives. – **Owen Paget, Ross-On-Wye, Herefordshire.**

Mercenary: The Second City

HERE are tips on how to escape the planet with 9,000,000 credits.

- Steal the Dominion Dart.
- Sell the large box to the mechanoids.
- Sell everything else you can lay your hands on to the Palyars – including the Mechanoid.
- Shoot all Mechanoid occupied positions.

You will also need to be in possession of the:

Grenade **Prestinium**	These make up the skeleton key.
Photon emitter	

To get the Neutron fuel you will need to be in possession of the Anti-grav which allows you to fly higher. It can be found at location 00-00, Altitude 88013.

You need the metal detector to identify Mechanoid positions – it turns the message bar blue when you are over one. You also need the pass, because if you don't have it you will be rewarded with it and not get the 1,000,000 credits.

If you manage to shoot a Palyar position make a quick note of its coordinates, then get the Anti-Time bomb which will rebuild it and you can shoot it again.

A final warning: Don't enter the prison in the colony craft laboratory because there is no escape. For further help with this addictive game take a look at the map on Page 32. – **S. Stevens, Andover, Hants.**

Fidget

ON level 10 you will come across Flindel the spider. To pass her you have to stand at the bottom of the ramp and wait for her web to disappear.

Go up the ramp and then go on to the ledge that juts out on the left. Wait for her web to pass you and carry on up to the top, then touch Flindel who will shrink and allow you to pass. – **F. Bowley, Hockley, Essex.**

Alternate Reality: The Dungeon

ON level one go to see the Oracle who, if you give him five gold pieces will give you information about quests to undertake. The ones that he speaks of are:

QUEST ONE

Seek the prison under the palace and free the prisoner with the silver key. To get it you must kill a master thief you encounter at a random location in the dungeon. After you get the key you must go to the palace dungeon on level one.

The prison is through the secret door in the sewer system. Once you have freed the prisoner you may learn a spell and you receive a staff piece. You will then be teleported in to a maze.

To solve this you must walk through the door immediately in front of you after you have been teleported. Then take the middle door, left door, left door, middle door and then the middle door again. This will take you to the tomb of Acrinimiral the wizard. After visiting there you are forced to go to death's door.

You are given the option of walking through it or using an item. If you try to walk through it a bug in the program seems to make it impossible to find any item to use with any effect. The only solution is to walk through a sewer door.

QUEST TWO

All you have to do is fight and kill the goblin king then fight the troll tyrant to recover two halves of an evil ring. Then take the two halves to the dwarven smithy on level two. He will reforge the ring for a gem or jewel. You then take the ring back to the Oracle.

QUEST THREE

Take the Marganna's tiara from level one to the war horse on level two. The tiara is found in the room with three wraiths in it. The war horse is found within the hall of mirrors on level two. Wear the tiara and you will have the chance to exchange it for a mirrored shield which you can use later.

QUEST FOUR

You are told to cross the river Stong at midnight. Unfortunately, I have been unable to do this, has any reader finished this quest?

GENERAL TIPS

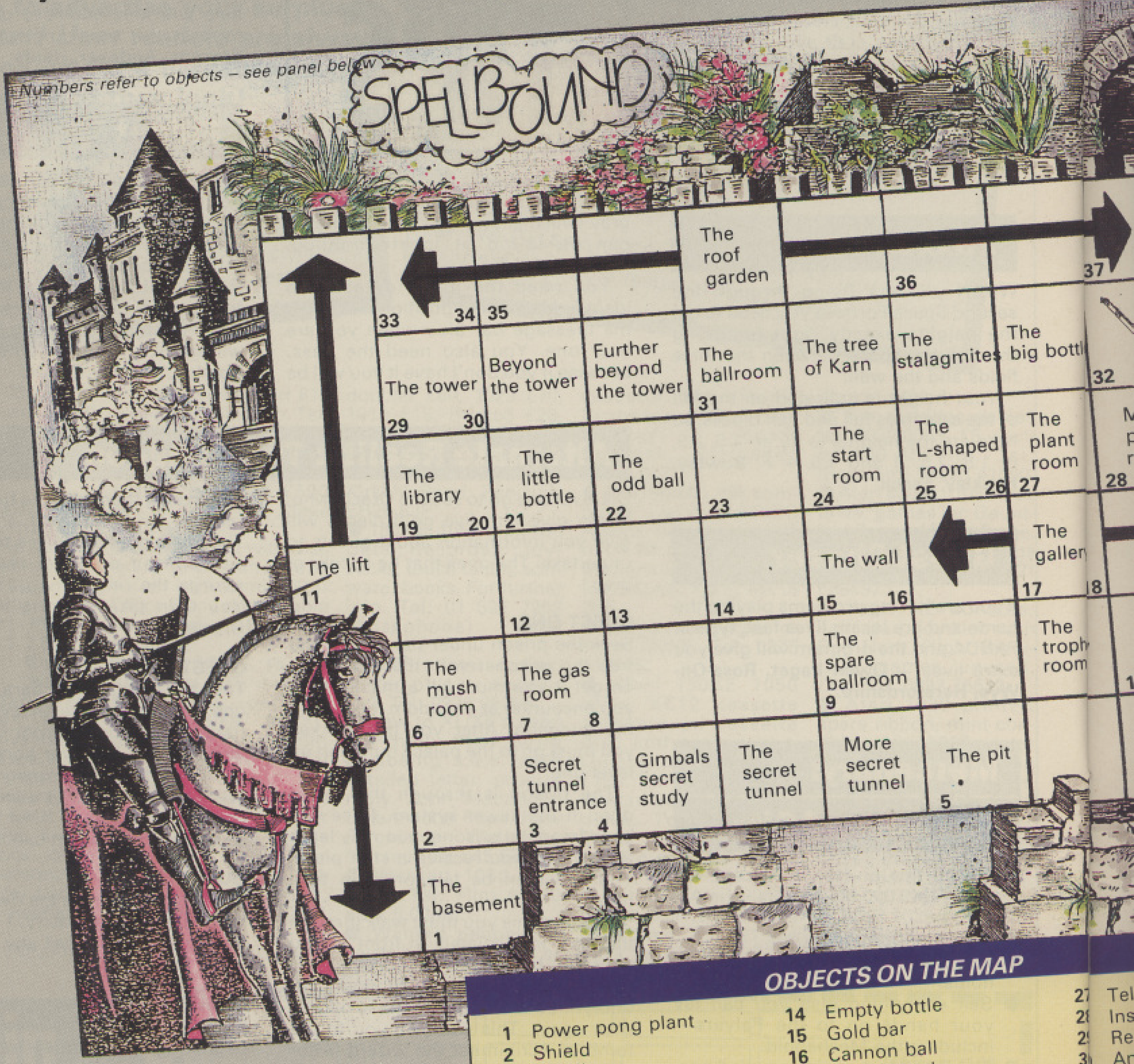
Fight only weak monsters at the beginning of the game – bats, rats and so on – until you advance to higher levels. Many weapons can be found scattered around the dungeon – some of them magical.

Use magic to discover where secret doors are. To gain a very powerful weapon use the sword of the adept in the hall of adept on level two. Then use the amethyst rod and you will be teleported to a secret corridor on level one where you will find the weapon. – **C.V. Howarth, Bowdon, Altrincham.**

SPELLBOU

THE MAP

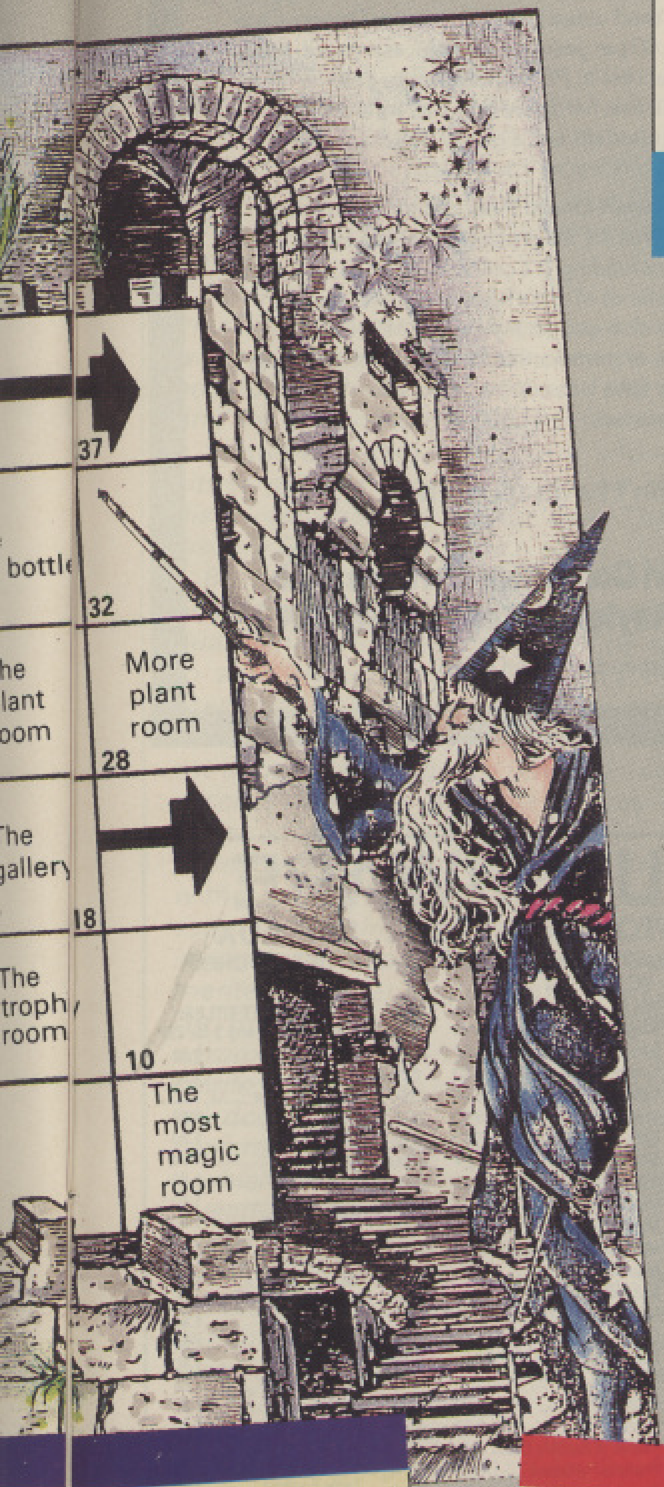
MIKE MOULTON invites you to enter the mystical world of adventure



OBJECTS ON THE MAP

1 Power pong plant
2 Shield
3 Puddle
4 Pocket laser
5 Broken talisman
6 Sticky bun
7 Book of runes
8 Gold goblet
9 Tube of glue
10 Trumpet
11 Crystal ball
12 Book of shadows
13 Brick
14 Empty bottle
15 Gold bar
16 Cannon ball
17 Blue crystal
18 White gold ring
19 Key
20 Engraved candle
21 Pewter tankard
22 Mirror
23 Saxaphone
24 Teleport key
25 Red herring
26 Glowing bottle
27 Tel
28 Ins
29 Re
30 Ar
31 Gr
32 Ja
33 Fo
34 B
35 R
36 P
37 V

ONE of the most popular budget titles for the Atari computer is Spellbound from Mastertronic. This graphical text adventure is extremely addictive and fun to play. So, for novices and experts alike, here is a guide to the spells, objects and personalities that grace the game.



27 Teleport pad
28 Instruction book
29 Red crystal
30 Ancient scroll
31 Green crystal
32 Javelin
33 Four leaf clover
34 Bottle of liquid
35 Runestone
36 Prism
37 Wand of command

Another exclusive from the ATARI USER mapping division

CLUES

- To get past the tower you need to take the two lumps of brickwork from the wall after Elrand has blown it down. Drop them on top of each other near the tower.
- To find the Banshee drop the glowing bottle. However, be careful only to do this after the Armouris Photonicus spell has been cast.
- If the character does not want to be summoned or commanded by you, then command it to be happy.

CHARACTERS AND WHAT THEY DO

Gimbal the Wizard	Will help you with the Release spell.
Thor	Give him the miolnir and he will help you get into the lift and in the tower.
Florin the Dwarf	Give him the bottle of liquid and take it back to restore your energy. Give him the tube of glue and the broken talisman and command him to help. Florin will then mend the talisman and it will become the magic talisman.
Orik the Cleric	Give him the crystal ball and he will help you get into the Most Magic room with the Crystallium Spectralis spell.
Samsun the Strong	Give him the javelin and he will help you at the pit.
Elrand the Halfelven	Give him the trumpet and he will help you at the wall after Thor has helped you at the tower.
Lady Rosmar	Give her the pocket laser and she will help you in the secret tunnel entrance.
The Banshee	Will tell you some clues if you command her to help.

SPELLS AND THEIR USES

Fumaticus Protectium	You will need the red herring and the power pong plant to cast this spell. It will protect you from the Gas room.
Armouris Photonicus	You will have to stand on the puddle in the secret tunnel entrance to cast this spell. It will allow you to go through the dark rooms without the glowing bottle.
Candelium Illuminatus	You will need the engraved candle and the shield to cast this spell. You will also need to put the four-leaf clover in the room. Once the candle is lit, you can use it to read the ancient scroll.
Project Physical Body	You will need the crystal ball and the magic talisman to cast this spell which will allow you to teleport to any character.
Crystallium Spectralis	You will need the three crystals and the white gold ring to cast this. You will also need to give the crystal ball to Orik and summon him to the Most Magic room. Once the spell has been cast, throw the three crystals at gimbal in order to free him.
Release Spell	You will need to be in the room with Gimbal after he is freed in order to cast this spell. Once the spell is cast, summon the characters in the order: Elrand, Samsun, Thor, Rosmar, Banshee, Florin, Orik and Gimbal. Make sure the characters are at full strength before you summon them.

OBJECTS ON PEOPLE

Florin	Axe
Samsun	Platform, elf horn
Elrand	Miolnir, loaf of elfbread
Rosmar	Willow Rod, fast blow fuse

SOFTWARE Solutions

Your programming problems solved by ANDRÉ WILLEY

LET's start off this month's column with a letter I received recently from Brian McIndoe from Bishops Cleeve in Cheltenham. He has a few useful comments to make about the 1050 disc drive.

❛ *I read with interest the letter in October's Software Solutions from A.W. Crawford who wanted to know whether or not it was possible to find out the density of a disc in a 1050 drive by interrogating the drive controller.*

Recently I wanted to do this in a machine language program I was writing. I found that it does seem to be possible with an unmodified 1050 to find the current disc density by issuing a Status command. First you should either read or write a sector on the disc – for example, sector one. Then issue a Status command.

Bit 7 of location $2EA *will be set to one if the drive has just read/written in dual density – otherwise it will be set to zero. According to* Mapping the Atari *this bit indicates whether or not a device is* intelligent, *and it is always set to one. My program, however, can successfully determine the density of a disc using this method.*

Readers accessing the 1050 drive without using Dos may also be interested in knowing how to format a disc in dual density as this is not documented in either Mapping the Atari *or* De Re Atari. *You should use the command* $22 *– instead of* $21 *for single density. The resident disc handler does not seem to recognise this command – at least, not in Revision A – which means you have to access SIO directly rather than by using* DSKINV.

The data direction byte $303 *should be set to receive* $40. *You should also set the buffer address to a spare point in memory because the list of any bad sectors – terminated by two* $FF *bytes – will be returned there. A timeout value of* $3F *would seem to be adequate.* Mapping the Atari *or* De Re Atari *will give people more information on using SIO.* ❜

Thanks for the information, Brian. I must warn readers that modified 1050 drives seem to respond differently to the density check portion of the Status command.

The other thing to bear in mind is that, to be sure of the result, you recommend a sector read or write before issuing the status command. If you're going to have to read a sector anyway, why not just read sector 1000 and if you don't get an error 139 then you know for certain that you're working in dual density? This has the advantage of also working with other drive types – even an old 810.

As to formatting in dual density, you are quite right in stating that the *SIO* command *$22* will accomplish this task. If you are using an XL or XE then you will find that the newer OS contained in your micro will enable you to use the *DSKINV* command, as *$22* is now supported.

Colour coding

Next a problem from **Mr J. Taylor** from Dalton-in-Furness in Cumbria:

❛ *I own an Atari 800XL with a 1050 disc drive which I use for monitoring the stock market, forecasting pools results and the usual round of general household uses. I have no interest in games, so my Atari is used for text programs only, usually in default graphics mode and colours.*

It would be useful if I could have different coloured text on a 40 column screen at the same time, but I can't figure out how to do it.

Could you please tell me how to get one line of text in default white and another in a different colour? ❜

The answer to your question is to select ANTIC mode *$04* graphics – otherwise known as GRAPHICS 12 on an 800XL – but this isn't quite as simple as it sounds.

To start with, GRAPHICS 12 will only allow access to the screen by means of PRINT #6 commands, and you also can't get ordinary text on the screen at the same time, except for the default bottom four lines.

Also GRAPHICS 12 is only available on XL and XE machines, which would be fine for you but would mean that the program wouldn't work on an old 400 or 800 – of which there are still a good number about.

There is also one other much more serious problem. The standard character set is not designed for multicoloured characters in GRAPHICS 12, so you won't be able to read the text easily.

Luckily all these problems can be overcome with a little work. Let's tackle the first two before going on to the character set. Since the screen you want is 40 columns wide and 24 lines

```
10 REM MULTICOLOURED 40 COLUMN TEXT
20 GRAPHICS 0
30 DLIST=PEEK(560)+PEEK(561)*256
40 READ BYTE
50 POKE DLIST+3,BYTE+64
60 FOR COUNT=6 TO 28
70 READ BYTE:POKE DLIST+COUNT,BYTE
80 NEXT COUNT
90 STOP
100 DATA 4,2,4,2,4,2,4,2,4,2,4,2,4,
2,4,2,4,2,4,2,4,2,4,2
```

Program I – Multicoloured text

deep, the display list will be almost identical to the standard GRAPHICS 0 version. The display list, for those who haven't been keeping up with their *Atari User*, is a set of instructions which the graphics chip Antic uses to generate the display you see on the screen.

Each line of text or graphics has an entry in the display list which tells ANTIC what colours to use, the size of the pixels and information used for operations such as scrolling text. For a 24 line screen – such as GRAPHICS 0 – there are 24 numbers, one for each screen line. Similarly a full-screen

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GRAPHICS 8 display would need 192 numbers.

Program I on the previous page will find out where this display list is located in memory – line 30, then POKE into memory the 24 new numbers contained in the data statement on line 100. For each screen line you want to be in GRAPHICS 0 you should

```
0 0 0 0 0 0 0 0
0 0 0 1 1 0 0 0
0 0 1 1 1 1 0 0
0 1 1 0 0 1 1 0
0 1 1 0 0 1 1 0
0 1 1 1 1 1 1 0
0 1 1 0 0 1 1 0
0 0 0 0 0 0 0 0
```

Figure I: Character A in Graphics 0

place a two in the data list, and each GRAPHICS 12 line should have a four. The example program as printed just alternates between the two modes.

This routine can be incorporated into your own programs, of course, and should be run after each use of the GRAPHICS 0 command. All the normal screen editing and printing functions will continue as though nothing had happened.

Now on to the second problem – the character set. Because of the way the

```
00  00  00  00
00  01  00  00
01  01  01  00
01  00  01  00
01  00  01  00
01  01  01  00
01  00  01  00
00  00  00  00
```

Figure II: Character A in Graphics 12, SETCOLOR 0

graphics chip works, colour characters are made up on a 4 x 8 grid of dots, rather than the usual 8 x 8 characters you are used to. This means that a special character set must be devised to take account of the changes.

In the normal set, a byte of character data is used to represent eight dots across the screen – each bit controlling one pixel, on or off. However, in the case of coloured text each pixel must have colour information in addition to on and off, so two bits are used per pixel – giving four possibilities: 00, 01, 10 and 11. Thus the limitation of four dots across each character – each byte can now hold the data for only four pixels.

A binary value of 00 selects the background colour (SETCOLOR register 4, or memory location 712 – otherwise used for the border colour). A value of 01 selects SETCOLOR register 0 (location 708) and 10 will select SETCOLOR 1 (location 709 – as used for the brightness of normal Mode 0 text).

A binary value of 11 in the character data performs a slightly different function. If the character is in the Ascii range 0 – 127 (normal text) it selects SETCOLOR 2 (location 710 – as used for the blue background area). If, however, the character is in inverse video (Ascii 128 – 255) the colour used is taken from SETCOLOR 3 (location 711). This in effect gives you five colours to work with – including the border/background – although it is a bit of a fudged method.

Figure I shows the way that a letter

```
00  00  00  00
00  10  00  00
10  10  10  00
10  00  10  00
10  00  10  00
10  10  10  00
10  00  10  00
00  00  00  00
```

Figure III: Character A in Graphics 12, SETCOLOR 1

is normally represented as bit data, and Figures II, III and IV show the same letter in three different colours for GRAPHICS 12. Note how I've left one pixel (two bits) of space at the side of the letter in each case, plus a space above and below the letter. This is to stop adjacent letters from butting into each other which would make them impossible to read.

If you are planning on using GRAPHICS 0 text on the same screen as multi-coloured text you should alter your SETCOLOR registers so that the background and the border are both the same colour. For example, to

```
00  00  00  00
00  11  00  00
11  11  11  00
11  00  11  00
11  00  11  00
11  11  11  00
11  00  11  00
00  00  00  00
```

Figure IV: Character A in Graphics 12, SETCOLOR 2/3 – see text

change them to black you would use SETCOLOR 2,0,0 and SETCOLOR 4,0,0.

Also don't forget that the brightness of GRAPHICS 0 text is governed by the same number as the colour of text with a bit-pattern of 10 – so don't make SETCOLOR 1 too dark or the writing will disappear.

As you are limited to 128 different characters at any one time you must decide which ones are not likely to be used and convert them into coloured letters using a character set editor such as that given in our ACE series in the April, May and June 1987 issues of *Atari User*.

I would suggest that the Control keys Ctrl-A to Ctrl-Z are converted to coloured versions of A to Z, and the lower case letters converted either to a second colour alphabet or numbers and punctuation marks, whichever prove to be the most useful in your program.

GAD screen dump

Let's finish this month with a quickie from **Phil Bonell** who is having problems with his 1029 printer:

“On asking for a printout, GAD throws up four choices – three type of printer and OTHERS. Choosing OTHERS lets you enter you own printer configuration.

The manual informs me of the answers to three of the four questions, but I can't answer the third: What code do you send to set up your printer to receive one line – $3C0 or 960 decimal bytes – of double density bit image graphics?

Could you possibly inform me if this program is compatible with the 1029, and if so what are the printer settings in hex and decimal?”

Well, Phil, I'm sorry to say that GAD and the 1029 are just not compatible. GAD uses an industry standard method for doing bit image graphics – which is to send a long block of data bytes giving the bit-patterns to print. Each byte sent represents eight dots on the printed page.

However, the 1029 – for reasons known only to Atari's marketing department – uses a 7 bit system in which the last bit of data is ignored by the printer. From this information it is fairly straightforward to deduce a number of pertinent facts regarding Atari's marketing department – none of which I will go into here!

Your best bet would be to convert the GAD pictures to an alternative form – possibly a 62 sector bit image file – which can be handled by a screen dump program. You will find programs to do both of these tasks in the January 1988 issue of *Atari User*.

3 CARD BRAG



BET or bluff? It's all a question of nerve when you play this version of the popular gambling game. The scene is set in a saloon, somewhere way out West. Your opponents – Doc, Kid and Tex – are ranged against you, each trying to win your, and each other's, money.

STEVE KNIGHT goes for his cards in this addictive simulation game

Your aim is to bankrupt them and leave the table with all the cash. But it ain't easy – this ain't no game fer greenhorns. You could be playing all night, or you could be knocked out of the game early. If this happens the session will continue without you until it's end.

At the start of each hand, $5 is deducted from each player and placed in the pot. When it is your turn to play – the computer will prompt you – you will have three choices: Bet, See or Stack. If you think your hand is good enough to win and your opponents are bluffing, or perhaps wish to bluff yourself, press keys 1–9 to indicate your bet in dollars. This must be equal to or greater than the minumum bet indicated on the screen.

If you decide to stack – that is to take no further part in this hand – press S. If all the other players have stacked, the last remaining player scoops the pot. If at any time only you and one other player are left in the game you can press C to see his hand.

This will bring the hand to an end with the player with the best cards winning. But remember, it costs at least double the current bet to see an opponent. In the event of the two hands being equal, it is the player who is *Seen* who wins the pot.

Table I lists all the possible hands in their order of strength. In the event of the major part of the hands being equal, the secondary elements are included. So, two Aces with a Queen will beat two Aces with a Jack. Similarly, a hand composed of Ace, King and Jack will beat a hand of Ace, King and three.

Title of hand	Composition
Prile of threes	Each of the three cards has a face value of three. This hand beats any other in Brag.
Prile	Any hand consisting of three cards of the same face value. The highest below threes is three Aces.
Run on the bounce	A run – see below – where all the cards are the same suit. Also known as a running flush.
Run	The three cards form a consecutive sequence, increasing by one. Ace, two, three is the highest, followed by Ace, King, Queen down to four, three, two.
Flush	Three cards of the same suit. Priority is decided as for High Card below.
Pair	Two cards of the same face value. A pair of Aces – or bullets – is the highest. In the event of a tie, the third card is used to resolve the issue.
High Card	All three cards are assessed on their individual face values. The best is Ace, King, Jack with the worst five, three, two.

Table I: Scoring three-card brag hands

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PROGRAM BREAKDOWN

110-500	Game loop
160-320	Hand loop
1000-1990	Initialisation subroutine
2000-2130	Cards dealt to remaining players
2200-2260	Card dealing routine
2270-2350	Arrays are sorted
2360-2490	Each hand is scored according to its contents
2500-2740	Reset arrays, totals and so on at the end of a hand
2800-2900	Player out of game routine
3000-3900	Format and display new screen
4000-4400	Computer opponent options
4500-4700	Routine for human player
4800-4900	One player left in hand routine
5000-5300	Who won the game? routine
5500-5580	Title page
6000-6200	Winner routine
7000-7600	Music

VARIABLES

CARDS	Holds card suits and values
IDENT$	Player's names
MESS$, M2$	Messages and comments storage areas
OBJ$, NAME$	Hold names in comments and messages
CHECK$	Checks to see what cards have been dealt
SUMS	Holds hand scores, cash totals and so on
PLAYERS	Number of players in the hand
LEFT	Number of players in the game
DEAL	Next player to be dealt
ARRAY	Common holding area for cards in deal
PAUSE	Music pause
NUM$	Display version of card numbers
SUT$	Display version of card suits
LIN$	Temporary hold for segment of *NUM$*
LIS$	Temporary hold for segment of *SUT$*
STK$, WIN$, LOSE$, SKINT$	Comments made at various points of the game
MINBET	Minimum bet
PF	Play factor calculated every game for computer player to determine how long he will stay in the hand
DIFF	Difference between the minimum bet and human player's bet

```
10 REM ********************
20 REM * THREE CARD BRAG *
30 REM *       BY        *
40 REM *  STEVE KNIGHT   *
50 REM *                 *
60 REM *  (C)ATARI USER  *
70 REM ********************
80 REM
90 GOSUB 5500:REM TITLE PAGE
100 GOSUB 1000:REM INITIALISE
110 GOSUB 2000:REM DEAL THE CARDS
120 GOSUB 2500:REM RESET FOR NEW HAND
130 IF LEFT=1 THEN GOTO 6000:REM END OF GAME
135 CLICK=1
140 GOSUB 3000:REM DISPLAY CARDS ETC.
150 CLICK=0
160 IF SUMS(PLAY,9)=0 OR SUMS(PLAY,10)=0 THEN 300
180 SCORE=SUMS(PLAY,2):NAME$=IDENT$(PLAY*3-2,PLAY*3)
200 IF PLAY=4 THEN GOSUB 4500:GOTO 220:REM YOUR PLAY
210 GOSUB 4000:REM ATARI BETS
220 IF PLAYERS=1 THEN GOSUB 4800:REM ONLY ONE LEFT
240 GOSUB 3000:REM DISPLAY CARDS ETC.
250 FOR D=1 TO 40:NEXT D
300 IF FIRSTP=PLAY THEN GO=GO+1
310 PLAY=PLAY+1:IF PLAY=5 THEN PLAY=1
320 IF PLAYERS>0 THEN 160
330 POSITION 28,19:? " Press  ":POSITION 28,20:? " Return ":POKE 754,0
340 IF PEEK(754)<>12 THEN 340
350 SOUND 1,10,12,14:FOR D=1 TO 5:NEXT D:SOUND 1,0,0,0
500 IF LEFT>1 THEN 110
1000 REM ** INITIALISATION **
1010 DIM CARDS(52,2):Z=1
1015 REM ** FILL PACK **
1020 FOR X=1 TO 4
1030 FOR Y=2 TO 14
1040 CARDS(Z,1)=Y:CARDS(Z,2)=X
1050 Z=Z+1
1060 NEXT Y
1070 NEXT X
1080 DIM IDENT$(12),MESS$(40),M2$(40),NAME$(6),CHECK$(52),OBJ$(6)
1090 IDENT$="KIDTEXDOCYOU"
1110 DIM SUMS(4,10)
1115 FOR CT=1 TO 4:SUMS(CT,10)=1:SUMS(CT,1)=200:NEXT CT
1120 PLAYERS=4:LEFT=4:PLAY=1:DEAL=1
1130 DIM ARRAY(3,2)
1135 PAUSE=2
1140 GOSUB 7000:REM ** MAKE MUSIC **
1200 DIM NUM$(50):NUM$="     2 23 34 45 56 67 78 89 9T TJ JQ QK KA A"
1210 DIM SUT$(18):SUT$="   ♥  ♣  ♠  ♦ "
1220 DIM LIN$(3),LIS$(3)
1250 OPEN #1,4,0,"K:"
1260 DIM STK$(250)
1265 STK$(1)="  THE GAME'S TOO HOT FOR "
1270 STK$(31)=" MEBBE A TIMELY STACK BY "
1280 STK$(61)="        YOU YELLER-BELLY,"
1290 STK$(91)=" RECK'ND YOU'D MORE GUTS,"
1300 STK$(121)=" YOU LILY-LIVERED SKUNK, "
1310 STK$(151)="AIN'T GONNA BE YOUR GAME,"
1320 STK$(181)="   COULD BE A WISE MOVE, "
1330 STK$(211)="     NO TIME FER HEROICS,   "
1400 DIM WIN$(250)
1410 WIN$(1)="  I GOT TOO MUCH FOR YOU,"
1420 WIN$(31)="  LOOKS LIKE YAH BLEW IT,"
1430 WIN$(61)="THIS'S A ONE-WINNER TOWN,"
1440 WIN$(91)="      LOOKS LIKE MY GAME,"
1450 WIN$(121)=" I KNEW YOU WUZ BLUFFIN',"
1460 WIN$(151)="        CALL THAT A HAND?,"
1470 WIN$(181)="I GUESS I OUTSMARTED YOU,"
1480 WIN$(211)="                    EAT DIRT,   "
1500 DIM LOSE$(250)
1510 LOSE$(1)=" NOW YOU KNOW WHO'S BOSS,"
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1520 LOSE$(31)="  YOU DON'T MESS WITH ME,"
1530 LOSE$(61)="   MORE CENTS THAN SENSE,"
1540 LOSE$(91)="  MORE WHERE THAT'S FROM,"
1550 LOSE$(121)="  LOOKS LIKE YAH BLEW IT,"
1560 LOSE$(151)="YOU OVER-REACHED YERSELF,"
1570 LOSE$(181)="         STICK TO ORIGAMI,"
1580 LOSE$(211)=" YOU COULDN'T SEE AN ALP,   "
1600 DIM SKINT$(250)
1610 SKINT$(1)="                 TAKE A POWDER,"
1620 SKINT$(31)="   DON'T GO AWAY MAD, JEST GO "
1630 SKINT$(61)=" PUT THE CAT OUT AS YOU LEAVE,"
1640 SKINT$(91)="THERE'S A STAGE AT 1-BE ON IT "
1650 SKINT$(121)="              GET ON YER HORSE,"
1660 SKINT$(151)="          HEAD WEST,"
1670 SKINT$(181)=" AIN'T NO ROOM FER GREENHORNS,"
1680 SKINT$(211)="           THANKS FER THE MONEY,  "
1990 RETURN
2000 REM ** DEALCARDS **
2010 CHECK$="                                                        ":REM 56 SPACES
2020 PL=1
2040 IF SUMS(PL,10)=0 THEN 2120
2050 GOSUB 2200
2060 AC=1
2070 FOR DL=3 TO 8 STEP 2
2080 SUMS(PL,DL)=ARRAY(AC,1):SUMS(PL,DL+1)=ARRAY(AC,2)
2090 AC=AC+1
2100 NEXT DL
2110 SUMS(PL,2)=SCORE
2120 PL=PL+1:IF PL<5 THEN 2040
2130 RETURN
2200 REM * FILL ARRAYS & SCORE HAND *
2210 FOR CT=1 TO 3
2220 R=INT(RND(1)*52)+1
2230 IF CHECK$(R,R)="X" THEN GOTO 2220
2240 CHECK$(R,R)="X"
2250 ARRAY(CT,1)=CARDS(R,1):ARRAY(CT,2)=CARDS(R,2)
2260 NEXT CT
2270 REM ** SORT ARRAY ASCENDING **
2280 FOR CT=1 TO 3
2290 FOR CX=1 TO 2
2300 IF ARRAY(CX,1)<=ARRAY(CX+1,1) THEN GOTO 2340
2310 HOLD=ARRAY(CX+1,1):ARRAY(CX+1,1)=ARRAY(CX,1):ARRAY(CX,1)=HOLD
2320 HOLD=ARRAY(CX+1,2):ARRAY(CX+1,2)=ARRAY(CX,2):ARRAY(CX,2)=HOLD
2340 NEXT CX
2350 NEXT CT
2355 REM ** NOW SCORE THE CARDS **
2360 SCORE=0
2370 X=ARRAY(1,1):Y=ARRAY(2,1):Z=ARRAY(3,1)
2380 A=ARRAY(1,2):B=ARRAY(2,2):C=ARRAY(3,2)
2385 REM ** PRILE **
2390 IF X=Y AND Y=Z THEN SCORE=10000:IF X=3 THEN SCORE=12000
2395 REM **  RUN  **
2400 IF (X+1=Y AND Y+1=Z) OR (X=2 AND Y=3 AND Z=14) THEN SCORE=6000:IF A=B AND B=C THEN SCORE=8000
2410 IF SCORE>ZERO THEN 2440
2415 REM ** FLUSH **
2420 IF A=B AND B=C THEN SCORE=4000
2425 REM ** PAIR **
2430 IF X=Y OR Y=Z THEN SCORE=2000
2440 IF X=2 AND Y=3 AND Z=14 THEN SCORE=SCORE+1600:RETURN
2450 IF SCORE<>2000 THEN 2480
2460 IF X=Y THEN SCORE=SCORE+(Y*100)+(X*10)+Z:GOTO 2490
2470 SCORE=SCORE+(Z*100)+(Y*10)+X:GOTO 2490
2480 SCORE=SCORE+(Z*100)+(Y*10)+X
2490 RETURN
2500 REM ** REHASH **
2505 GRAPHICS 16:SETCOLOR 2,12,2:SETCOLOR 4,3,0:POKE 752,1
2510 KITTY=0:DIFF=0
2520 FOR CT=1 TO 4
2540 IF SUMS(CT,10)=0 THEN SUMS(CT,1)=0:SUMS(CT,2)=0:GOTO 2590
2550 IF SUMS(CT,1)>5 THEN KITTY=KITTY+5:SUMS(CT,1)=SUMS(CT,1)-5:SUMS(CT,9)=1:GOTO 2590
2560 GOSUB 2800:REM **WIPED OUT**
2590 NEXT CT
2600 PLAYERS=LEFT:MINBET=1
2620 IF SUMS(DEAL,10)=0 THEN 2670
2630 PLAY=DEAL:NAME$=IDENT$(DEAL*3-2,DEAL*3):DEAL=DEAL+1:IF DEAL=5 THEN DEAL=1
2650 MESS$(1,3)=NAME$:MESS$(4)=" TO PLAY...":GOTO 2700
2670 DEAL=DEAL+1:IF DEAL=5 THEN DEAL=1
2680 GOTO 2620
2700 BET=0:GO=0
2710 FIRSTP=PLAY
2720 IF LEFT=1 THEN GOTO 4000
2740 RETURN
2800 REM ** WIPED OUT **
2810 MESS$(1,3)=IDENT$(CT*3-2,CT*3):MESS$(4)=" WILL TAKE NO MORE PART.."
2840 R=INT(RND(0)*8):RA=R*30+1
2845 OBJ$(1)=IDENT$(CT*3-2,CT*3)
2846 IF CT=4 THEN OBJ$(1)="GRINGO"
2850 M2$(1)=SKINT$(RA,RA+29):M2$(31)=OBJ$(1)
2860 LEFT=LEFT-1
2875 GOSUB 3420:REM *PRINT MESSAGES*
2880 FOR D=1 TO 200:NEXT D
2890 SUMS(CT,10)=0
2900 RETURN
3000 REM ** SHOWALL **
3010 REM
3020 FOR CT=3 TO 7 STEP 2
3030 IF SUMS(1,10)=0 THEN 3100
3035 X=1:Y=8
3040 IF SUMS(1,9)=1 THEN GOSUB 3700:GOTO 3060
3050 A=SUMS(1,CT):B=SUMS(1,CT+1):GOSUB 3800
3060 POSITION 5,13:? "KID $";SUMS(1,1);"  "
3100 IF SUMS(2,10)=0 THEN 3200
3110 X=14:Y=1
3120 IF SUMS(2,9)=1 THEN GOSUB 3700:GOTO 3140
3130 A=SUMS(2,CT):B=SUMS(2,CT+1):GOSUB 3800
3140 POSITION 17,6:? "TEX $";SUMS(2,1);"  "
3200 IF SUMS(3,10)=0 THEN 3300
3210 X=27:Y=8
3220 IF SUMS(3,9)=1 THEN GOSUB 3700:GOTO 3240
3230 A=SUMS(3,CT):B=SUMS(3,CT+1):GOSUB 3800
3240 POSITION 28,13:? "DOC $";SUMS(3,1);"  "
3300 IF SUMS(4,10)=0 THEN 3400
3310 X=14:Y=18
3330 A=SUMS(4,CT):B=SUMS(4,CT+1):GOSUB 3800
3340 POSITION 9,20:? "YOU":POSITION 9,21:? "$";SUMS(4,1);"  "
3400 NEXT CT
3410 POSITION 19,10:? "$";KITTY;"  "
3420 POSITION 3,15:? "                                    "
3430 POSITION 3,16:? "                                    "
3440 POSITION 3,15:? MESS$
3450 POSITION 3,16:? M2$
3470 MESS$(1)="":M2$(1)=""
3500 RETURN
3700 REM ** DRAW CARD BACKS **
3705 IF CLICK=1 THEN SOUND 0,0,0,0:SOUND 0,0,1,12
3710 X=X-5:X=X+(CT*2)
3720 FOR N=Y TO Y+4
3730 POSITION X,N:? "***"
3740 NEXT N
3750 RETURN
3800 REM ** DRAW CARD **
3805 IF CLICK=1 THEN SOUND 0,0,0,0:SOUND 0,0,1,12
3810 LIN$=NUM$(A*3)
3820 LIS$=SUT$(B*3)
3830 X=X-5:X=X+(CT*2)
3840 POSITION X,Y:? LIN$
3850 POSITION X,Y+1:? "███"
3860 POSITION X,Y+2:? LIS$
3870 POSITION X,Y+3:? "███"
3880 POSITION X,Y+4:? LIN$
3900 RETURN
4000 REM ** ATARIBET **
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4010 MESS$(1)="":M2$(1)=""
4020 STACK=1:REM * =0 TO SHOW CARDS *
4025 SCORE=SUMS(PLAY,2)
4030 IF SCORE<2000 THEN PF=0+(SCORE>1100)+(SCORE>1400)
4040 IF SCORE>2000 AND SCORE<4000 THEN PF=3+(SCORE>2400)+(SCORE>2900)+(SCORE>3300)
4050 IF SCORE>4000 AND SCORE<6000 THEN PF=5+(SCORE>4900)+(SCORE>5100)
4060 IF SCORE>6000 AND SCORE<8000 THEN PF=8+(SCORE>6900)+(SCORE>7200)
4070 IF SCORE>8000 THEN PF=15
4080 IF SCORE>9000 THEN PF=20
4090 IF SCORE>10000 THEN PF=30
4100 IF SCORE>12000 THEN PF=40
4110 PF=PF-(5-PLAYERS)
4120 R=INT(RND(1)*2)
4130 PF=PF+R
4140 PF=PF-GO+1
4150 IF MINBET>7 AND SCORE<2000 AND R=1 THEN PF=PF-1
4160 IF PLAYERS=2 AND PF<3 AND SCORE>1350 THEN GOSUB 5000:STACK=0:GOTO 4300:REM ** SEE **
4170 IF PF>1 OR PLAYERS=1 THEN 4200
4180 STACK=0:BT=0:PLAYERS=PLAYERS-1
4190 MESS$(1,3)=NAME$:MESS$(4)=" HAS STACKED.."
4195 R=INT(RND(0)*8):RA=R*30+1:M2$=STK$(RA,RA+25):M2$(26)=NAME$:GOTO 4300
4200 IF PF<2 OR SUMS(PLAY,1)<20 THEN BT=MINBET:GOTO 4300
4220 BT=BT+(4-PLAYERS)
4230 RA=INT(RND(1)*3)
4240 BT=MINBET+(R=1)+(SCORE>4000)+(SCORE>8000)+RA+(PEEK(20)>90)
4300 IF BT>9 THEN BT=9
4305 FOR CT=0 TO BT:SOUND 1,2,12,14:FOR D=1 TO 5:NEXT D:SOUND 1,0,0,0:NEXT CT
4310 IF STACK=0 THEN SUMS(PLAY,9)=0:RETURN
4330 MINBET=BT
4340 MESS$(1,3)=NAME$:MESS$(4)=" HAS BET $":MESS$(14)=STR$(BT)
4350 IF DIFF>5 THEN M2$(1)="YOU DON'T FRIGHTEN ME,GRINGO":DIFF=0
4360 KITTY=KITTY+BT
4370 SUMS(PLAY,1)=SUMS(PLAY,1)-BT
4380 SUMS(PLAY,9)=1
4400 RETURN
4500 REM ** YOUR PLAY **
4505 DIFF=0
4510 FOR D=1 TO 100:NEXT D
4520 MESS$(1)="YOUR PLAY..MINIMUM BET $":MESS$(25)=STR$(MINBET)
4530 M2$(1)="PRESS 'S' TO STACK,'C' TO SEE"
4550 GOSUB 3410:REM *PRINT MESSAGES*
4560 GET #1,A
4565 BET=A-48
4570 IF A=83 OR A=67 THEN 4580
4575 IF BET<MINBET OR BET>9 THEN 4560
4580 IF A=67 AND PLAYERS<>2 THEN M2$="YOU MAY ONLY SEE WITH 2 PLAYERS":GOTO 4550
4581 IF A=83 THEN BET=1
4582 IF BET=67 THEN BET=MINBET*2
4585 FOR CT=1 TO BET:SOUND 1,10,12,14:FOR D=1 TO 5:NEXT D:SOUND 1,0,0,0:NEXT CT
4590 IF A=67 THEN GOSUB 5000:GOSUB 3000:RETURN
4600 IF A=83 THEN SUMS(4,9)=0:PLAYERS=PLAYERS-1:RETURN
4610 SUMS(4,1)=SUMS(4,1)-(A-48):DIFF=(A-48)-MINBET:MINBET=A-48:KITTY=KITTY+(A-48)
4700 RETURN
4800 REM ** ONE LEFT **
4810 FOR CT=1 TO 4
4820 IF SUMS(CT,9)=0 THEN 4850
4830 SUMS(CT,1)=SUMS(CT,1)+KITTY
4840 M2$(1)=IDENT$(CT*3-2,CT*3):M2$(4)=" SCOOPED THE POT":SUMS(CT,9)=0:CT=4
4850 NEXT CT
4860 PLAYERS=0
4900 RETURN
5000 REM ** SEE YOU **
5010 MESS$(1)="":M2$(1)=""
5020 NAME$(1)=IDENT$(PLAY*3-2,PLAY*3)
5030 SCORE=SUMS(PLAY,2)
5040 MINBET=MINBET*2
5050 BT=MINBET
5060 KITTY=KITTY+BT
5070 SUMS(PLAY,1)=SUMS(PLAY,1)-BT
5080 FOR CT=1 TO 4
5090 IF PLAY=CT OR SUMS(CT,9)=0 OR SUMS(CT,10)=0 THEN 5200
5095 OBJ$(1)=IDENT$(CT*3-2,CT*3)
5100 MESS$(1)=NAME$:MESS$(4)=" SAW ":MESS$(9)=OBJ$:R=INT(RND(0)*8):RA=R*30+1
5110 IF SCORE>SUMS(CT,2) THEN SUMS(PLAY,1)=SUMS(PLAY,1)+KITTY:MESS$(12)=" AND WON THE POT":M2$(1)=WIN$(RA,RA+25)
5140 IF SCORE<=SUMS(CT,2) THEN SUMS(CT,1)=SUMS(CT,1)+KITTY:MESS$(12)=" AND LOST":M2$(1)=LOSE$(RA,RA+25)
5150 IF OBJ$(1,1)="Y" THEN OBJ$(1)="GRINGO"
5155 IF NAME$(1,1)="Y" THEN NAME$(1)="GRINGO"
5160 IF SCORE>SUMS(CT,2) THEN M2$(26)=OBJ$(1):GOTO 5200
5170 M2$(26)=NAME$(1)
5200 SUMS(CT,9)=0
5210 NEXT CT
5220 PLAYERS=0
5300 RETURN
5500 REM ** TITLE PAGE **
5510 REM
5520 GRAPHICS 18:SETCOLOR 4,1,2
5530 POSITION 3,3:? #6;"WeLcOmE"
5540 POSITION 5,5:? #6;"PaRdNeR,"
5550 POSITION 3,7:? #6;"PuLL up"
5560 POSITION 8,9:? #6;"A ChAiR"
5580 RETURN
6000 REM ** WE HAVE A WINNER!! **
6010 REM
6020 FOR CT=1 TO 4:IF SUMS(CT,10)>0 THEN X=CT:POP :GOTO 6040
6030 NEXT CT
6040 GRAPHICS 18:SETCOLOR 4,7,2
6050 NAME$(1)=IDENT$(CT*3-2,CT*3)
6060 POSITION 8,0:? #6;NAME$
6070 POSITION 7,2:? #6;"WIPED"
6080 POSITION 6,4:? #6;"everyone"
6090 POSITION 8,6:? #6;"OUT"
6100 POSITION 0,8:? #6;"THANKS FER THE GAME,"
6120 POSITION 5,9:? #6;"GENTLEMEN.."
6125 PAUSE=5
6130 GOSUB 7000:GOSUB 7000
6200 END
7000 REM ** MUSIC **
7005 RESTORE 7500
7010 FOR CT=1 TO 79
7020 READ A:READ B
7030 FOR N=1 TO B STEP PAUSE
7040 SOUND 0,A,10,14
7050 NEXT N
7060 SOUND 0,0,0,0
7070 NEXT CT
7500 DATA 114,10,108,10.102,10,64,25,102,10,64,25,102,10,64,80
7510 DATA 64,10,57,10,53,10,50,12,64,10,57,10,50,20,64,12,57,20,64,80
7520 DATA 114,10,108,10,102,10,64,25.102,10,64,25,102,10,64,80
7530 DATA 64,10,68,10,72.10,76,10,64,10,57,10,50,20,57,10,64,10,76,10,57,80
7540 DATA 114,10,108,10,102,10,64,25,102,10,64,25,102,10,64,80
7550 DATA 64,10,57,10,53,10,50,12,64,10,57,10,50,20,64,12,57,20,64,80
7560 DATA 64,10,57,10,53,10,50,13,64,10,57,10,50,20,64,10,57,10,64,10,50,12,64,10,57,10,50,20
7570 DATA 64,10,57,10,53.10,50,12,64,10,57,10,50,20,64,13,57,25.64.70
7600 RETURN
```

Get it right!

LINE	CHSUM	LINE	CHSUM	LINE	CHSUM
10	CP1 (Y)	240	Q33 (H)	1115	G88 (E)
20	CP2 (3)	250	C9F (U)	1120	EAV (9)
30	CP3 (X)	300	3VV (G)	1130	6YS (D)
40	CP4 (4)	310	DR6 (6)	1135	TMK (R)
50	CP5 (Y)	320	JFG (T)	1140	2M6 (5)
60	CP6 (7)	330	89F (D)	1200	JX1 (1)
70	CP7 (X)	340	MC6 (P)	1210	TXD (5)
80	CP8 (8)	350	2HM (M)	1220	GWQ (Q)
90	SQU (P)	500	CYQ (P)	1250	14W (F)
100	PG2 (E)	1000	CXN (H)	1260	4YJ (2)
110	PN2 (P)	1010	8Y9 (9)	1265	A5G (M)
120	PX2 (D)	1015	D5N (G)	1270	COO (Y)
130	TH9 (V)	1020	X4J (9)	1280	O2F (C)
135	QJP (J)	1030	4UF (H)	1290	AT8 (P)
140	Q32 (8)	1040	RQT (O)	1300	E4T (O)
150	QEP (7)	1050	KMM (1)	1310	HXQ (H)
160	4CG (X)	1060	P3S (4)	1320	5CH (G)
180	7DA (7)	1070	P3S (1)	1330	CP1 (1)
200	9PK (P)	1080	ECE (7)	1400	4RJ (A)
210	PS3 (G)	1090	LRR (L)	1410	36A (8)
220	JHL (A)	1110	8TR (5)	1420	FO2 (H)

LINE CHSUM	LINE CHSUM	LINE CHSUM	LINE CHSUM	LINE CHSUM	LINE CHSUM	LINE CHSUM	LINE CHSUM	LINE CHSUM
1430 DVC (R)	2070 C3T (Q)	2415 DNP (U)	2845 NV3 (Y)	3410 4DX (N)	4050 28D (E)	4505 QGA (Y)	5060 ENA (9)	6070 W8X (K)
1440 381 (5)	2080 2SE (6)	2420 6S9 (N)	2846 XCN (L)	3420 E85 (Q)	4060 2Q6 (X)	4510 JT1 (3)	5070 WAS (8)	6080 9N6 (G)
1450 JSP (6)	2090 S51 (Q)	2425 DQP (K)	2850 8MU (8)	3430 EE7 (K)	4070 SWQ (K)	4520 QF9 (P)	5080 453 (H)	6090 VRF (H)
1460 4JA (1)	2100 PWT (X)	2430 6VV (K)	2860 X1V (N)	3440 KM8 (T)	4080 SXC (9)	4530 G7F (J)	5090 U15 (R)	6100 YK5 (U)
1470 AMW (U)	2110 C6V (1)	2440 84M (M)	2875 3SQ (Y)	3450 F2C (1)	4090 V4U (M)	4550 34J (3)	5095 N66 (F)	6120 9DJ (A)
1480 OA6 (O)	2120 PDM (2)	2450 PYJ (T)	2880 KMO (2)	3470 AFF (H)	4100 UQG (Y)	4560 PVR (G)	5100 1LD (Q)	6125 TNQ (S)
1500 7WR (Q)	2130 VML (4)	2460 A8L (5)	2890 112 (K)	3500 VXM (N)	4110 FFY (F)	4565 TMW (M)	5110 TVY (1)	6130 L9D (W)
1510 EDR (2)	2200 D6P (O)	2470 LJA (Q)	2900 WFL (H)	3700 DTQ (K)	4120 7N3 (C)	4570 LVF (F)	5140 FS2 (E)	6200 D9X (1)
1520 AL8 (H)	2210 3UO (Y)	2480 S3T (V)	3000 CXQ (M)	3705 R7K (H)	4130 TFP (W)	4575 C45 (Y)	5150 JYM (1)	7000 CXU (1)
1530 8RK (D)	2220 9EE (H)	2490 WDL (T)	3010 DOQ (H)	3710 CE3 (X)	4140 V22 (O)	4580 2Q3 (U)	5155 NVL (4)	7005 XSJ (Q)
1540 7TF (2)	2230 92V (W)	2500 DKP (W)	3020 C1U (L)	3720 7NR (A)	4150 FAF (1)	4581 7SS (X)	5160 6YJ (N)	7010 7N5 (O)
1550 8C6 (R)	2240 6AF (5)	2505 JQD (W)	3030 NH8 (A)	3730 GUK (5)	4160 SC9 (A)	4582 18S (S)	5170 2M8 (N)	7020 OMN (2)
1560 H9V (W)	2250 YWR (L)	2510 9UO (7)	3035 W53 (3)	3740 P5U (4)	4170 5C5 (X)	4585 KQ4 (E)	5200 SS4 (V)	7030 VSP (H)
1570 8HF (7)	2260 QLT (R)	2520 4EO (R)	3040 S1V (4)	3750 WHM (1)	4180 86J (E)	4590 N77 (4)	5210 Q9W (J)	7040 46E (G)
1580 G3P (J)	2270 DMP (W)	2540 QPX (O)	3050 P6Q (H)	3800 DXQ (1)	4190 S4L (X)	4600 JAN (E)	5220 X7H (L)	7050 NCY (9)
1600 C61 (U)	2280 490 (O)	2550 9F9 (Q)	3060 7KX (D)	3805 RCK (4)	4195 4JP (6)	4610 UD4 (M)	5300 VPP (L)	7060 YYY (7)
1610 GSR (9)	2290 4GO (X)	2560 377 (C)	3100 NGH (E)	3810 72L (N)	4200 HNT (5)	4700 W6N (Q)	5500 DKS (L)	7070 QEY (8)
1620 JA3 (A)	2300 VYH (T)	2590 R5T (O)	3110 USE (J)	3820 7KG (F)	4220 H69 (7)	4800 DXR (H)	5510 DMS (L)	7500 XVP (3)
1630 N36 (3)	2310 7UY (V)	2600 POA (O)	3120 S24 (G)	3830 CN3 (7)	4230 92V (V)	4810 4Q2 (G)	5520 UV5 (K)	7510 D4A (D)
1640 OR3 (X)	2320 809 (4)	2620 W2S (L)	3130 PC7 (C)	3840 G9Q (D)	4240 H4X (C)	4820 Q38 (4)	5530 4SF (Y)	7520 YOP (7)
1650 CC1 (U)	2340 QQT (F)	2630 MMS (7)	3140 82G (P)	3850 387 (L)	4300 AC6 (8)	4830 TS9 (U)	5540 4EC (3)	7530 Q5D (O)
1660 4MW (N)	2350 QNT (5)	2650 YKU (3)	3200 NMR (X)	3860 JNM (Y)	4305 P6G (K)	4840 DDL (6)	5550 5P7 (3)	7540 Y4P (A)
1670 WMG (L)	2355 DSP (O)	2670 CH9 (A)	3210 V12 (P)	3870 3H7 (O)	4310 SK3 (M)	4850 R9V (F)	5560 UD6 (W)	7560 H2R (N)
1680 H62 (9)	2360 TV6 (K)	2680 QCW (J)	3220 S8D (1)	3880 JWG (L)	4330 X5X (P)	4860 Y7G (9)	5580 WFP (V)	7570 DGY (G)
1990 XOK (A)	2370 NUU (K)	2700 TNL (1)	3230 PLQ (M)	3900 WFM (H)	4340 8MF (7)	4900 WFN (E)	6000 CXT (W)	7600 W2R (G)
2000 CXP (G)	2380 ME7 (T)	2710 OQL (9)	3240 HQH (Q)	4000 CXR (L)	4350 WH5 (D)	5000 CXS (G)	6010 DOT (V)	
2010 WX7 (9)	2385 DYP (V)	2720 TTV (L)	3300 NTO (7)	4010 9KG (6)	4360 F19 (C)	5010 9KH (U)	6020 MR4 (X)	
2020 D8E (L)	2390 S99 (4)	2740 WFL (Q)	3310 VGE (U)	4020 VV5 (O)	4370 WPR (A)	5020 3R5 (L)	6030 Q5X (J)	
2040 TN3 (3)	2395 E1P (2)	2800 DXP (P)	3330 PV7 (W)	4025 GHO (O)	4380 67H (5)	5030 GE1 (K)	6040 UG6 (H)	
2050 SM1 (S)	2400 LMX (1)	2810 217 (Q)	3340 HTD (E)	4030 4UJ (2)	4400 VTN (7)	5040 E4R (Q)	6050 MF8 (4)	
2060 DCJ (P)	2410 TEU (V)	2840 POQ (9)	3400 QGU (5)	4040 ULP (6)	4500 DKR (6)	5050 X6D (F)	6060 VLK (R)	

It's time to find your position

LEN GOLDING continues his introduction to Basic programming

THIS month we start exploring the mysteries of computer games, and show you some of the techniques you will need to write your own text and graphics adventures. We begin by looking at the various methods of printing text and graphics characters anywhere on screen.

Along the way we'll encounter several punctuation marks with a personality of their own, the CHR$ function, and the Basic command POSITION.

There's a Basic utility program which automatically converts a screen full of text or graphics characters into PRINT statements for you.

Let's start by looking at the PRINT command in detail. Whenever Basic encounters a PRINT statement, it looks to see where the cursor is currently positioned on screen, and starts printing your text at that point. If the screen is already full, everything scrolls upwards to make room for the next line of text, so you lose any information that was stored at the top.

When printing is completed, Basic automatically returns the cursor to the left-hand margin on the next line, scrolling the screen upwards again if it needs to.

This is fine while you're programming, and it's useful for very simple user-input tasks. But for a text adventure or graphics game you will need much greater control over precisely what is printed, and where.

First let's look at Basic's desire to start a new line with every PRINT statement:

```
10 PRINT "HELLO THERE"
20 PRINT "HELLO","THERE"
30 PRINT "HELLO";"THERE"
```

Run the program above and you'll find that line 10 prints what you would expect, but line 20 prints:

```
HELLO     THERE
```

with the two words on the same line, and several spaces between them. Line 30, on the other hand, prints:

```
HELLOTHERE
```

with no gap at all. The comma and semicolon are obviously acting as extra instructions to modify the PRINT command.

Both the comma and the semicolon instruct Basic to forget about starting a new line. A comma moves the cursor to the next available tabulator stop before printing anything else – there are normally four stops on each line, spaced at 10 column intervals. A semicolon, on the other hand, holds the cursor at its current position, ready for the next character to be printed.

The system still works, even if there are two PRINT statements on different program lines:

```
10 PRINT "HELLO",
20 PRINT "THERE"
```

And there can be other Basic instructions between the two PRINT statements, so long as none of these alter the cursor's position. Here are a couple of examples:

```
10 DIM A$(40)
20 PRINT "PLEASE TELL ME YOUR NAME"
30 INPUT A$
40 PRINT "PLEASED TO MEET YOU ";A$
```

or:

```
10 PRINT "FUEL AVAILABLE = ",
20 F=500
30 PRINT F;" LITRES"
```

Notice that if you use a semicolon

between text strings, any spaces you want leaving between words must be printed as part of the strings themselves – that's why there's a space before LITRES in line 30. Try experimenting until you can be sure of printing exactly what you want on a single text line.

While we're on the subject of punctuation marks, there are two others worth mentioning: The question mark (?) can be used instead of the word PRINT, as in:

```
10 ? "HELLO"
```

And the colon (:) lets you put more than one Basic statement on a single line, as in:

```
10 DIM A$(40):INPUT A$:?"HELLO ";A$
```

The colon tells Basic where one statement ends and the next begins, and you can use it with any Basic command, not just PRINT. This can reduce the number of program lines, and also helps to speed up program execution. Remember, though, that a program line cannot occupy more than three screen lines, so there's a limit to the number of statements you can squeeze in.

The comma and semicolon are fine when you're faced with relatively simple printing tasks, but there are occasions when you have to print text at very precise locations on screen. The simplest way of doing this is to use the Basic command POSITION. Here's an example:

```
10 POSITION 14,11:PRINT "CENTRALISED".
```

The two numbers after POSITION tell the computer where to start printing. The first is the number of columns in from the left, while the second is the number of rows down from the top. In this example, the word *CENTRALISED* will be printed 14 columns in and 11 rows down.

The screen mode we're using at the moment has 40 columns and 24 rows, so you can use any number from 0 to 39 for the horizontal co-ordinate, and any number from 0 to 23 for the vertical one. Remember that if you PRINT anything on the bottom line, Basic will normally scroll the screen upwards to make room for its *READY* message.

Using POSITION you can send the cursor to any point within the screen's boundaries, but it won't move until the next PRINT statement is executed. The command lets you insert scores into a text line or table, without having to re-print the whole lot whenever the score changes. For example:

```
10 POSITION 2,15 :PRINT "YOUR NUMBER IS"
20 POSITION 2,10 :PRINT "GIVE ME A NUMBE
   R FROM 0 TO 999"
30 INPUT N
40 POSITION 17,15:PRINT N;"  "
50 GOTO 20
```

It's important to type this in and play with it, to see the differences between this screen format and the one produced by conventional PRINT statements. You'll see that the words *YOUR NUMBER IS* are printed only once, though the chosen number – which is on the same line – can change as many times as you like. And there's no need for commas or semicolons, because the POSITION statement moves the cursor to precisely where you want it, over-riding Basic's natural tendencies.

Also notice that two spaces are printed after the new value of *N* – on line 40. This ensures that all digits of the old number are wiped out when the new number is printed. Leave out the spaces, and see what happens when you type random numbers with one, two or three digits.

It's worth taking time to master the POSITION command, as you'll need it for all types of games, especially the arcade variety.

Let's move on now to a more unusual use of PRINT: Producing pictures on screen. You may have noticed that if you hold down the Control key, pressing most other keys will produce a graphics symbol which is different from the letter, number or symbol printed on the keytop. These are known as *control characters*, and you can use them to produce pictures, tables, graphs or any other kind of two-dimensional drawing.

These various characters were shown in last month's issue, together with the keystrokes which produce them. Each has its own unique number – known as its Ascii code – and these can be used in conjuction with a function called CHR$, as an alternative way of selecting characters to print on screen. For example:

```
10 PRINT CHR$(0)
```

will give you the heart character, while:

```
10 PRINT CHR$(20)
```

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will produce a little ball. Try this:

```
10 PRINT CHR$(77);CHR$(65);CHR$(71);
CHR$(73);CHR$(67)
```

A few of the control characters act like commands. For example, if you tell the computer to PRINT CHR$(125), it will clear the screen, while PRINT CHR$(253) will produce a short beep from the speaker.

Table I shows the *Command* characters in more detail. Their symbols cannot normally be printed on screen, because any PRINT statement containing them will trigger the command function.

There is a way, however, of temporarily disabling a command symbol, by printing the Esc character – Ascii code 27 – immediately in front of it. For example:

```
10 PRINT CHR$(125)
```

will clear the screen, but:

```
10 PRINT CHR$(27);CHR$(125)
```

will print the clear screen symbol – a small bent arrow – without clearing the screen. The Esc character does not appear – it's interpreted simply as an instruction to disable the command symbol which immediately follows. The system works only once for each character, so if you want to print more than one command symbol, you must put the Esc code in front of each one, like this:

```
10 ? CHR$(27);CHR$(28);CHR$(27);CHR$(2
9);CHR$(27);CHR$(30);CHR$(27);CHR$(31)
```

If you want to type any command symbols directly into a literal string, press the Esc key once before typing each character.

The symbols will appear on the program line, but when that string is printed during program execution the characters will carry out their command functions. For example, a bent arrow in a literal string will clear the screen when that string is printed. Try this:

```
10 PRINT "[ESC CONTROL/CLEAR] SCREEN C
  LEARED"
```

The square brackets indicate that we are talking about key presses, not actual words, so you press Esc followed by the Control+Clear keys simultaneously, then the words *SCREEN CLEARED*. The result will look like this:

```
10 PRINT " SCREEN CLEARED"
```

If you want a command character's symbol – not its function – to be generated when your literal string is printed, press the Esc key three times before typing the character.

After the second press, the Esc character – a sort of double E – will appear, then the third press followed by Control+Command will give you the command symbol. Now when you run your program, the symbol will be printed, just like an ordinary character.

This all sounds a bit complicated, so compare this example with the one above:

```
10 PRINT "[ESC ESC ESC CTRL+CLEAR]SCRE
  EN NOT CLEARED"
```

Using control characters you can

Ascii code	Symbol	Keystrokes to print symbol	Function
27	Ɛ	ESC	Disable command function (see text)
28	↑	ESC CTRL+-	Move cursor up one row
29	↓	ESC CTRL+=	Move cursor down one row
30	←	ESC CTRL++	Move cursor left one column
31	→	ESC CTRL+*	Move cursor right one column
125	↰	ESC CTRL+CLEAR	Clear screen
126	◀	ESC BACK S	Erase character to left of cursor
127	▶	ESC CTRL+TAB	Advance to next tab stop
156	[inverse ↑]	ESC SHIFT+BACK S	Delete line containing cursor
157	[inverse ↓]	ESC SHIFT+>	Insert a line above the cursor line
158	[inverse ←]	ESC CTRL+TAB	Clear tab stop at cursor position
159	[inverse →]	ESC SHIFT+TAB	Set tab stop at cursor position
253	[inverse ↰]	ESC CTRL+2	Generate a short beep
254	[inverse ◀]	ESC CTRL+BACK S	Delete character under cursor
255	[inverse ▶]	ESC CTRL+>	Insert a blank space at cursor position

NB: □ Denotes inverse character

Table I: Command characters

build up pictures and tables on the screen. However, it's a tedious job, and involves a great deal of trial and error to get each character positioned correctly in its PRINT statement.

The listing below makes life a good deal easier. When you run it, you can use all the keyboard's functions to put characters on the screen and move them around until they are exactly where you want them.

When you're happy with the screen's appearance, press Control+2 and follow instructions as they appear. The end result will be a new Basic program which, when it is run, will print the screenful of characters exactly as you designed it.

The only characters you can't use are the command symbols and the double quotes (''), because these cannot be written directly into literal strings and the program can't type Esc characters for you. The symbols could, however, be inserted by hand when the rest of the screen has been encoded into PRINT statements. To insert a double-quotes character, split the literal string at the desired point, then insert CHR$(34), bracketed by semicolons. For example:

```
10 PRINT "THIS IS A LITERAL STRING"
20 PRINT "THIS IS A";CHR$(34);"LITERAL"
;CHR$(34);" STRING"
```

Before we leave the subject of command symbols, there's one other technique you may find useful. You can permanently disable all the command functions with a single statement: POKE 766,1. Now the symbols will all behave like normal Ascii characters.

This means that the control functions aren't available from the keyboard either – for example, the cursor movement keys won't work. You can restore the status quo by POKE 766,0, so it's easy to switch the command functions on and off at different points in your program.

● *Next month we'll look at simple character animation and create the illusion of movement on screen.*

```
32500 REM USE KEYBOARD AS USUAL. PRESS
 CONTROL/2 TO CONVERT THE SCREEN DATA
INTO BASIC PRINT STATEMENTS.
32502 DIM A$(915),B$(40),C$(12),BLANK$
(38)
32504 BLANK$="
                   ":REM 40 SPACES
32506 OPEN #1,4,0,"K:"
32508 GRAPHICS 0:POKE 752,1
32510 REM FIRST PUT ALL YOUR CHARACTER
S ON SCREEN
32512 GRAPHICS 0
32514 GET #1,A
32516 IF A=253 THEN POKE 752,1:? CHR$(
158);:GOTO 32528:REM INITIATE CONVERSI
ON IF CONTROL/2 PRESSED
32518 IF PEEK(85)=35 THEN GOSUB 32664:
REM SHORT BEEP NEAR END OF EACH LINE
32520 IF A=155 THEN IF PEEK(84)=23 THE
N POSITION 0,0:? CHR$(253);:GOTO 32514
:REM RETURN ON LAST LINE=CURSOR HOME
32522 IF PEEK(84)=23 THEN IF PEEK(85)=
39 THEN ? CHR$(30);CHR$(253);:GOTO 325
14:REM END OF SCREEN
32524 ? CHR$(A);:GOTO 32514
32526 REM NEXT COPY SCREEN INTO A$
32528 N=1:SOUND 0,100,10,6
32530 FOR ROW=0 TO 23:FOR COL=2 TO 39
32532 POSITION COL,ROW:GET #6,A
32534 A$(N,N)=CHR$(A):N=N+1
32536 NEXT COL:NEXT ROW
32538 SOUND 0,0,0,0
32540 REM GET DESIRED LINE NUMBER AND
INCREMENT
32542 TRAP 32542:GRAPHICS 0:? :? "INPU
T STARTING LINE NUMBER: ";
32544 INPUT LSTART
32546 ? :? "INPUT INCREMENT: ";
32548 INPUT INC:?
32550 REM COPY EACH LINE IN TURN FROM
A$ INTO B$, FOR CHECKING AND ENCODING
32552 LASTLINE=23:POKE 752,1
32554 FOR LINE=23 TO 0 STEP -1:SOUND 0
,80,10,8
32556 LNUM=LSTART+LINE*INC
32558 P=LINE*38:? CHR$(125):? :SOUND 0
,0,0,0
32560 FOR N=1 TO 38
32562 X=P+N:B$(N,N)=A$(X,X)
32564 NEXT N
32566 IF B$<>BLANK$ THEN FLAG=1:GOTO 3
2572
32568 IF FLAG=0 THEN LASTLINE=LASTLINE
-1:GOTO 32586
32570 ? LNUM;" ?":GOTO 32580
32572 IF LINE=23 THEN B$(38,38)=CHR$(2
7):B$(39,39)=CHR$(28):GOTO 32576
32574 IF B$(38,38)<>" " THEN B$(39,39)
=CHR$(27):B$(40,40)=CHR$(28)
32576 ? LNUM;" ? ";CHR$(34);B$:B$=""
32578 REM USE "FORCED READ" MODE TO CO
NVERT LINES INTO PRINT STATEMENTS
32580 ? :? :? "CONT"
32582 POSITION 0,0:POKE 842,13:STOP
32584 POKE 842,12
32586 NEXT LINE
32588 REM PREPARE TO SAVE STATEMENTS
32590 ? CHR$(125):? "Would you like to
 save the temporary":? "instruction fi
le to:"
32592 ? :? "C= CASSETTE":? :? "D= DISK
"

32594 GET #1,A:IF A=67 OR A=68 THEN 32
598
32596 GOTO 32590
32598 GOSUB 32668:GRAPHICS 0:POSITION
2,4
32600 IF A=68 THEN 32618
```

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```
32602 REM SAVE TO CASSETTE:
32604 IF A=67 THEN ? "Insert cassette to hold temporary":? :? "file, press RECORD  and  PLAY ,"
32606 ? :? :? "then press  START ":GOSUB 32666:TRAP 32608:LPRINT
32608 ? CHR$(125):POSITION 2,4:? "LIST ";CHR$(34);"C:";CHR$(34);",";LSTART;",";LASTLINE*INC+LSTART
32610 POKE 764,12:? :? :? :? "CONT"
32612 POSITION 2,2:POKE 842,13:STOP :POKE 842,12
32614 GOTO 32636
32616 REM SAVE TO DISC:
32618 ? CHR$(125):? "Enter file name...":? :?
32620 INPUT C$:IF C$="" THEN 32618
32622 ? :? :? "Insert disc to hold temporary":? "file, then press  START  to
"
32624 ? "create ";C$
32626 GOSUB 32666
32628 ? CHR$(125):POSITION 2,4
32630 ? "LIST";CHR$(34);"D:";C$;CHR$(34);",";LSTART;",";LASTLINE*INC+LSTART
32632 ? :? :? :? "CONT":POSITION 2,2:POKE 842,13:STOP
32634 POKE 842,12
32636 ? CHR$(125):POSITION 2,3:? "Files created in this way may be":? "merged with your existing program"
32638 ? "using the command:"
32640 IF A=67 THEN ? :? "ENTER ";CHR$(34);"C:";CHR$(34)
32642 IF A=68 THEN ? :? "ENTER ";CHR$(34);"D:";C$;CHR$(34)
32644 POSITION 2,12:? "Press  START  to erase the current":? "page of text, and start another"
32646 GOSUB 32666
32648 ? CHR$(125):FOR LN=LSTART TO LASTLINE*INC+LSTART STEP INC
32650 POSITION 2,4:? LN:? :? :? "CONT"
32652 POSITION 2,2:POKE 842,13:STOP
32654 POKE 842,12:NEXT LN
32656 ? CHR$(125):? :? "press START to write another screen"
32658 GOSUB 32666
32660 REM SUBROUTINES
32662 ? CHR$(125):POSITION 8,2:GOTO 32512
32664 SOUND 0,100,10,4:FOR W=1 TO 10:NEXT W:SOUND 0,0,0,0:RETURN
32666 IF PEEK(53279)<>6 THEN 32666
32668 SOUND 0,80,10,2:FOR W=1 TO 30:NEXT W:SOUND 0,0,0,0:RETURN
```

£10 LETTER

DIY worked with a dicky disc drive

I WAS in the middle of a massive backing-up session when, suddenly, my trusty 810 disc drive emitted a bang and a clatter and packed up completely.

With fear and trepidation I removed the cover and discovered what had gone wrong. There is a metal band which translates the rotary motion of a capstan to the linear movement of the head carriage – this had broken.

All that was needed was a piece of stainless steel shim one thousandth of an inch thick, but the best that several Atari repair shops could offer was a replacement head and capstan unit costing at least £50.

Nothing ventured, nothing gained, so I decided to repair it myself. I was able to get enough shim to last me a lifetime from a local supplier.

I removed the old broken band and taped it into my Atari notebook. Then I measured it up and drew its exact shape on to the new shim using the sharp point of a pair of scissors to score the outline.

I cut the three fixing holes as squares using a modelling knife and used the scissors to cut round the outline of the band which I then put in the disc drive.

The drive appeared to work, but the head needed aligning with track 1.

I used an oscilloscope to monitor the output from the head and, having undone the capstan setscrew, I moved the head carriage by hand to the point of maximum signal from track one on a spare formatted disc.

I tightened the screw and checked the setting using a number of other discs including a few commercial ones.

Having gained some confidence, while I had the drive exposed I checked several other adjustments which may be made to ensure that I could get the maximum signal from the disc.

So far I have had no further problems with this drive. I can access all my discs, as the head is reasonably well aligned and I have learnt a lot about how a disc drive works. Furthermore, if it happens again I know what to do. – **M. R. Holland, Lower Penn, South Staffordshire.**

Sorry, tape only

A FEW weeks ago I bought Boulderdash Construction Kit on tape because the shop didn't have it on disc. I designed a level and when I tried to save it to disc it reported "Check your drive".

It has done this ever since. Can you tell me why this happens and how can I fix it? – **Jamie Beszelzen, Hockley, Essex.**

● Although the program comes up with the option to save to disc or tape, it will only work with a tape deck. This is unfortunate but, sadly, a fact.

In Never Never Land

I HAVE an 800XL and have just finished entering in Snowball from the December 1987 edition of Atari User.

I typed it all out correctly, as there were no error messages, but when I ran it to my grief three hours typing went down the drain. All that appeared was a black screen with two green shapes on it.

I tried Get It Right! but I could not understand what the letters and numbers meant.

Then I realised that I had run it before I saved it, although the article said if you run the game and there are any typing errors it may cause the computer to crash as the DLI is used.

Could you tell me what the letters and numbers mean on Get it Right! and what it means by the computer crashing? Also are there any errors in the listing? – **Kara Ball, Keynsham, Nr. Bristol.**

● When a computer program is typed in each individual line is assigned a unique set of numbers – or checksum. The Get it right! program prints this.

By referencing these numbers against the list in the magazine you will instantly know whether you have entered the line correctly.

The fact that no errors were reported doesn't mean that you haven't made a mistake. For example, if you enter A=8 when you should have entered A=B the program won't work, but no error will be reported.

Crashing the computer – or locking the system up – are just terms given to an acute ailment computers are heir to. If you tell it to do something that it doesn't like or isn't supposed to do, it will wander off into Never Never Land. And no matter what you do you can't get it back.

This is always a possibility when typing in data statements that form part of a machine code routine.

WIN A TENNER!

EACH month we will award £10 prizes for the most interesting letters sent to us.

So now there's more reason than ever to contribute to our lively mailbag pages.

Get your pens out, start writing and you could be one of the winners. The address:

Mailbag Editor
Atari User
Europa House
Adlington Park
Adlington
Macclesfield SK10 4NP

Tape troubles

I BOUGHT an Atari 800XI and a 1010 recorder. At first it worked OK but after a short time it damaged the tapes so I could not play them again. I took the recorder back to Dixons who sent it away.

They then returned it saying their was nothing wrong with it and it must be the tapes. What can you advise me to do?

I also own a 1050 disc drive which works well, but I would like to still be able to play budget tapes. – **Damien Gipson, Bideford, North Devon.**

● We get a lot of letters about this sort of thing hap-

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pening to 1010 tape decks. The 1010 is usually a reliable recorder if used and looked after correctly, but if cheap tapes are used problems often arise.

Your best solution is to get someone who knows what they're doing to check the head alignment and clean it and the pinchwheel.

If the recorder still gives problems after this take it to a reliable service engineer in your area.

Atari User Mailbag

WE welcome letters from readers – about your experiences using the Atari micros, about tips you would like to pass on to other users . . . and about what you would like to see in future issues.

The address to write to is:

Mailbag Editor
Atari User
Europa House
Adlington Park
Adlington
Macclesfield SK10 4NP

The pro approach

I HAVE just bought an Atari 65XE and I would like to know how you would go about programming a professional game. Is there such a thing as a games designer, or will I have to go back to loops, pokes and graphics?

All I ever get is errors, errors and more errors. So please can you help before I overheat with confusion and errors? – **Darren Clewley, Milton Keynes, Bucks.**

● A program called the Arcade Machine was written and released in America by a company called Broderbund. The utility was written in 1982 so it may be difficult to obtain. US Gold deals with a lot of Broderbund software and may be able to help you. The address is Broderbund/US Gold, Units 2/3 Holbard Way, Holbard, Birmingham, B6 7AX. Tel:021-356 3388.

Submarine sunk

A FORTNIGHT ago I bought an Atari 65XE and a copy of Atari User. *I have had an Atari 800XL before, so I am familiar with the keyboard, but sad to say not with programming.*

I typed in Submarine Hunter and checked it carefully – especially the data – but when I entered RUN it came up with error 6 which applies to the data in line 8920. Could you help me out of this problem?

Also do programs for the old 48k work on the 65XE? – **J.G. Gibson, Penzance, Cornwall.**

● There are no errors in the program as it is printed. Line 8920 contains a READ command that reads the data statements: You will need to check them all very carefully.

Not all programs written for the 400/800 machines work on the 65XE. Some differences in the operating systems has cause a slight incompatibility. However, most programs published in *Atari User* work on all Atari 8 bit computers.

Finding the vertical bar

I HAVE had an Atari 800XL for some months now and enjoyed typing in the programs that you have published.

I would be grateful if you could tell me how you type in the vertical bar character that appeared in line 370 of Dicer in the January 1988 issue of Atari User? – **C.P. Allen, Peterborough.**

● This is one of those elusive control characters the Atari computer possesses. To obtain it press Control+V.

If you look in the February issue of *Atari User* you will find a table showing all the characters and the keystrokes required to get them.

Programs appreciated

THE Picture Processor and the Post Printer in the January issue of Atari User *were two very good programs. They will come in very useful to a lot of 1029 owners who, like myself, do not find a lot of programs for dumping pictures to their printer.*

The ease with which you can convert different file formats is very useful. It shows other 1029 users just what can be done with a little bit of patience and practice. – **J.E. Rice, Ipswich, Suffolk.**

Sharp for stereo, but not programs

RECENTLY I acquired an Atari 400. My knowledge of Basic programming is minimal, but enough to write programs of sufficient length to warrant the need for some peripheral storage device.

Several people have advised me that my Sharp stereo cassette player should be compatible, but I do not have the required multiport five pin DIN connector.

Could you let me know whether my stereo cassette is compatible and if so where could I purchase the connector or where I can find the necessary information needed to build such a device?

In future, when my knowledge of Basic and financial circumstances have improved, I plan to purchase a disc drive. However, until such time I hope you will be able to help me find an economical solution to my storage problem. – **Trefor W Roberts, Menai Bridge, Gwynedd.**

● Unfortunately your tape recorder will not plug directly into an Atari. An interface used to be available for converting the signal from a normal tape deck to one that your POKEY sound chip could understand.

However, we don't know if the company is still trading and so your only option is to buy an Atari deck. The XC12 is available for around £30 from various advertisers in this issue.

You could also take a look at the classified section of the magazine.

Groans, no grunts

I OWN an Atari 800XL and was wondering when someone is going to release a wrestling game for my computer. I think a company like US Gold could write one, as it has produced them for other computers.

I feel that the Atari has

great capabilities for games, but a wrestling game seems to be just what it hasn't got – it would be a great success. Do you know if any are going to be made in the future? – **John Alan Robinson, Whitley Bay.**

● We don't know if US Gold is going to release such a game for the Atari. An American software company did bring out a game called Bop 'n' Wrestle, but it was only ever released in America.

DIP in for those elusive £ signs

£10 LETTER

I FIND that when I use Mini Office II with my Panasonic KX-P1081 printer it will print the elusive £ by simply keying #. Yet no one seems to have bothered to mention this in reviews or the handbook.

In fact the manual advises using print code strings to define it. There seems to be no reason why this should not work with other printers – have you any idea why it is not recommended?

I would go on to say that, with Epson compatibles Mini Office II seems superior to Atari Writer Plus, and the only complaints I can level are that there seems to be no built-in underline command so it consumes two of the 10 code strings allowed, and double spaced print cannot be defined for part of a document.

Does anyone know how to overcome these problems? – **J.E. Robinson, Millom, Cumbria.**

● Whether the # sign outputs a £ sign depends on the DIP switch settings inside the printer.

Most printers can be set to do this, but it's not always automatic.

Gauntlet blues

RECENTLY I had a major disappointment while playing US Gold's Gauntlet. After nearly three hours I reached level 110 and I was horrified to see the same sheet repeated over and over again after that.

At level 130 boredom finally overcame me and I was forced to turn the computer off. Was my copy of the game at fault, was it my computer, or is it a fault with the actual game?

Also, is US Gold planning to bring out International Karate II on the Atari? – **G.J. Hagon, Dagenham, Essex.**

● There is nothing wrong with your copy of the game: This is how it has been programmed. At the moment there appear to be no plans for International Karate II, but if it turns up a review will appear in *Atari User*.

WP on the 800XL

I HAVE just bought an Atari 800XL and would like to know if the Atari Writer Plus word processor is available on tape for it. Also, can Atari SMM804 printers be connected to my computer without a Graphics AT Interface? – **Charlton Ferrao, Canning Town, London. E16.**

● The AtariWriter Plus program is a disc-based word processor. However, the old AtariWriter cartridge will work with a tape deck.

The SMM804 printer is a dot matrix model designed for the ST Personal computers or the IBM PC and compatibles – it won't work on an 800XL.

Happy impulse

IN December I went to Curry's to buy a Walkman for our nine year old son's Christmas present. You guessed – I returned with an Atari 65XE computer pack.

I had a great sense of guilt at my impulse buying, and didn't have a clue about computers at all.

As time has gone by my guilt feelings have gradually receded because of help from friends and reading Atari User. *Gradually I have learnt that computers are not boring, they're really quite interesting. They have opened a whole new world of interest for me – which is quite amazing to a mere female!* – **Rosemary Campbell, Kirkby Stephen, Cumbria.**

Get it Right!

I OWN an Atari 800XL and am new to computing and very willing to learn. I typed in Bounder from the June 1987 issue of Atari User *but, try as I may, it won't run.*

Could it be the program uses machine code and do I need an assembler language? – **J. Chapman Peterlee, Co. Durham.**

● The program is written entirely in Basic and works fine on an 800XL if you key it in correctly.

You will find that you have made some typing error. Check the program very carefully using Get it Right!

Starwars on hold

IN THE April 1987 issue of Atari User *you said that a conversion of the Starwars coin-op series is promised for the Atari 8 bit by the end of the year.*

Where is it? I was eagerly awaiting the release of this game and as the end of the year rolled around I noticed it was being released for other computers but not for Atari.

I am rather disappointed that 8 bit users seem to have been left out. Maybe we will be seeing it later in the year. – **J. Elliott, West Sussex.**

● Domark Software unfortunately changed its mind about releasing an 8 bit version of this superb game. It has no plans to bring out a version, so we will just have to hope that another software company takes up the challenge.

Replacement switch

My children have an 800XL with 1010 tape machine with a broken switch. Do you know where I can get a replacement? – **Mrs K.B. Shipp, Horsham, W.Sussex.**

● Replacement keys for the 1010 tape deck can be obtained from Silica Shop. The price is £1.12 – which includes VAT and postage and packing – for two keys. Silica Shop can be contacted on 01-309 1111.

Racing round the Atari

I HAVE an Atari 800XL and I would like to know if any car games have been released for it. Could you please give me a list of them? – **Derek Broad, Christchurch, Dorset.**

● A lot of car games have been written for Atari 8 bit computers over the years. They include Pole Position, Pitstop, Pitstop II, Baja Buggies, Rally Speedway, Racing Destruction Kit and many more.

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"The program took three man years of programming time to produce – and it shows. The Pawn is the stuff from which cults are made."

– Anthony Ginn, Atari User, May 1986



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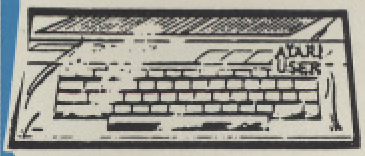
– Bob Chappell, Atari User, October 1987

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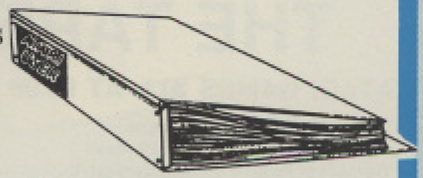
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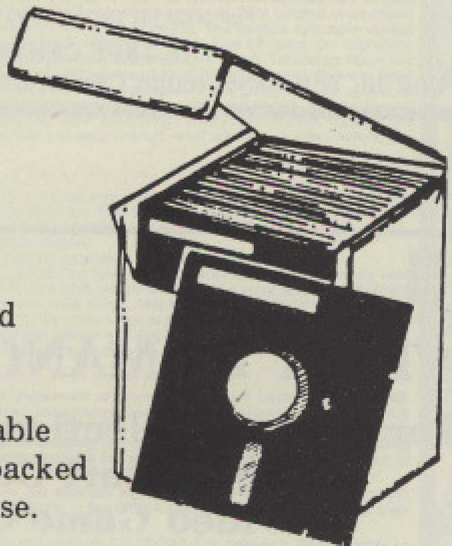
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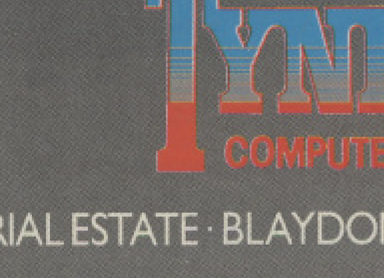
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